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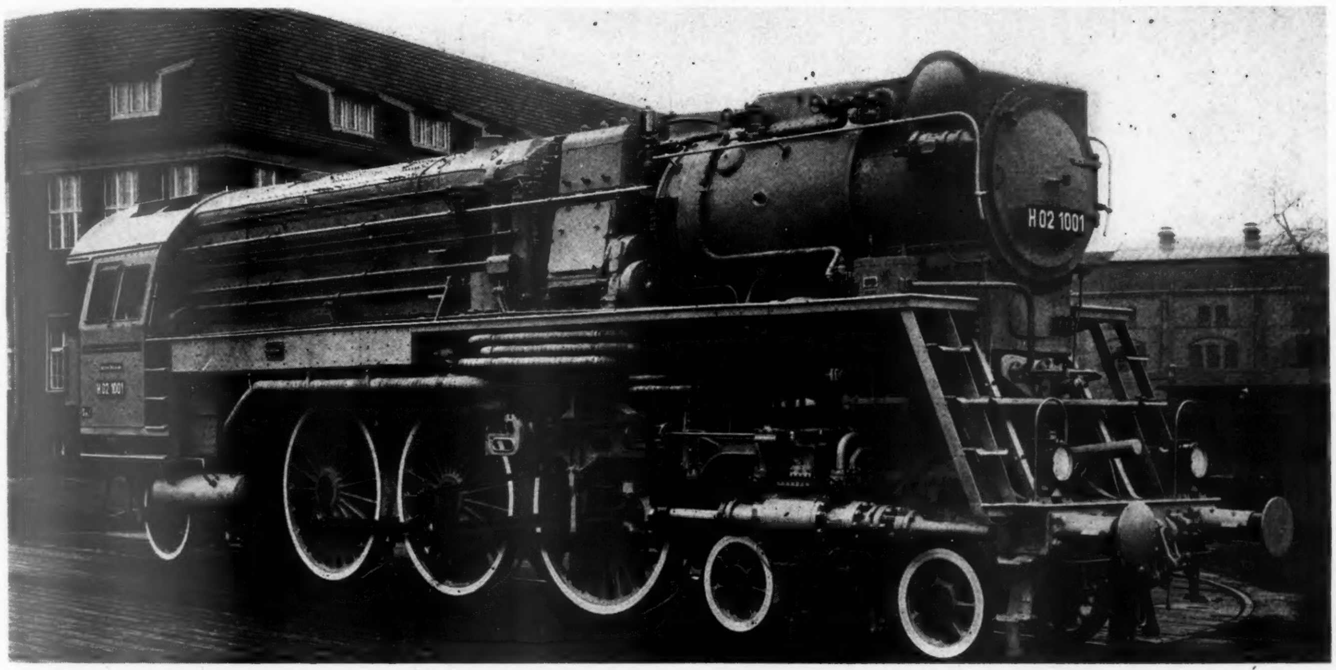


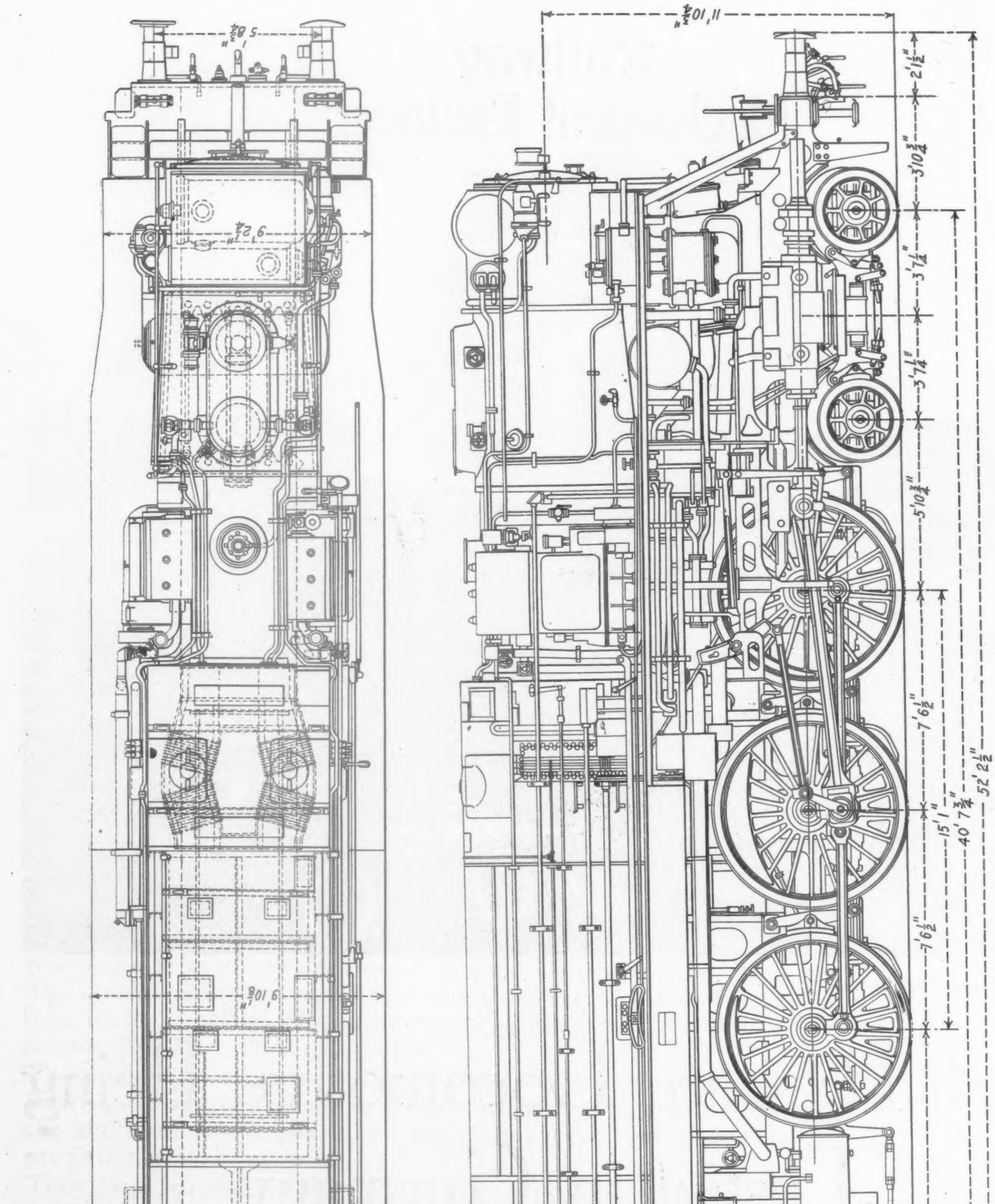
The Schwartzkopff-Loeffler high-pressure locomotive

High-Pressure Locomotive Being Tested in Germany

Pacific type built for the German State Railways on the Loeffler principle—Boiler pressure of 1,700 lb.

CONSIDERABLE interest has been shown on the part of railroad men in the United States and Canada in the experiments which have been made during the past few years with the co-operation of the German State Railways in developing locomotives for operation with high-pressure steam. At the present time the German State Railways have three locomotives of the Schmidt high-pressure double-pressure design in service and one high-pressure locomotive which generates steam by what is generally known as the Loeffler system.

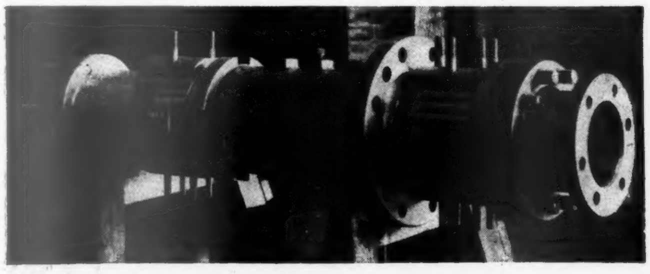
Descriptions of the Schmidt high-pressure locomotive have been published at different times in the *Railway*



Plan and elevation of the Schwartzkopff-Loeffler high-pressure locomotive

Mechanical Engineer, the most complete of which appeared in August, 1928, page 440, and December, 1928, page 670. Two locomotives of this design have been ordered for experimental service on this continent, one by the Canadian Pacific and the other by the New York Central. The locomotive for the Canadian Pacific is now under construction and is expected to be completed the latter part of this year.

The following information relative to the Loeffler high-pressure locomotive was furnished by Herr Fuchs, director, purchasing department, German State Railways, Berlin. It was built by the Berliner Mashinenbau Acktien Gesellschaft, formerly L. Schwartzkopff, Berlin, which firm is the licensee for the Loeffler system. This locomotive, known as the Schwartzkopff-Loeffler, was



One of the high-pressure cylinders

first tested by the manufacturers at Berlin-Wildau and was later given a series of complete tests on the Berlin-Grunewald plant of the German State Railways. No reports as to the results of these tests or tests in road service have as yet been made available.

The Loeffler Principle of Steam Generation

The Loeffler principle of steam generation was developed in 1924 by the late Prof. Dr. St. Loeffler, and

Table Showing the Principal Dimensions, Weights and Proportions of the Schwartzkopff-Loeffler 4-6-2 Type Locomotive

Railroad	German State Railways	
Builder	L. Schwartzkopff	
Type of locomotive	4-6-2	
Service	Experimental passenger	
Cylinders, diameter and stroke	H.P.— 8.66 in. by 25.98 in. L.P.—23.62 in. by 25.98 in.	
Valve gear, type	Walschaert-Schwartzkopff	
Weights in working order:		
On drivers	132,240 lb.	
Total engine	253,019 lb.	
Wheel bases:		
Driving	15 ft. 1 in.	
Total engine	40 ft. 7¾ in.	
Wheels, diameter outside tires:		
Driving	78.7 in.	
Front truck	33.46 in.	
Trailing truck	49.2 in.	
Boiler:		
Type	Loeffler-double pressure	
Steam pressures	H.P.—1,700 lb. L.P.—213.35 lb.	
Fuel, kind	Soft coal	
Grate area	25.84 sq. ft.	
Heating surfaces:		
Low-pressure boiler (evaporative)	882.67 sq. ft.	
High-pressure superheater	968.79 sq. ft.	
Low pressure superheater	344.46 sq. ft.	
High-pressure feedwater heater	764.27 sq. ft.	
Combined boiler heating surfaces	2,960.19 sq. ft.	
Rated tractive force, estimated	37,000 lb.	
Weight proportions:		
Weight on drivers ÷ total weight engine, per cent		52.3
Weight on drivers ÷ tractive force		3.58

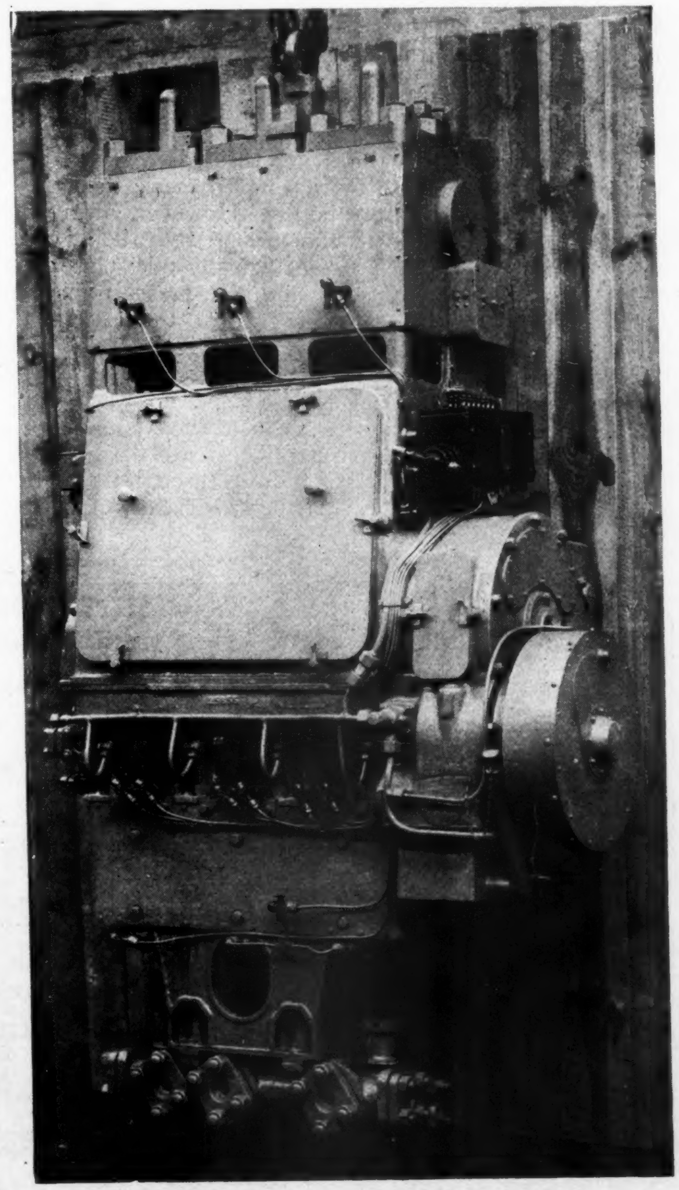
the first experimental boiler installation was made in the power plant of the Florisdorf Locomotive Works, near Vienna, Austria. The principal installations of the Loeffler system are in the power plant at Vienna and in a power plant of the Witkowitz coal mines in Czechoslovakia.

The Schwartzkopff-Loeffler locomotive is the first installation of the system on railroad steam power. It is a three-cylinder compound 4-6-2 type and develops an estimated tractive force of 37,000 lb. The outside cylinders take high-pressure steam at 1,700 lb. per sq. in. and have a diameter of 8.66 in. The inside cylinder, which is centrally located between the two high-pressure cylinders, takes steam at a pressure of 213.35 lb. It is 23.62 in. in diameter and has the same stroke as the high-pressure cylinders, 25.98 in. The diameter of the drivers is 78.7 in. The principal dimensions, weights and proportions are shown in the table.

The Design and Operation of the Boiler

The operation of the Loeffler system as applied to this locomotive is illustrated in the schematic diagram shown in one of the illustrations. The firebox consists of a system of small tubes which are joined to horizontal headers arranged on both sides of the firebox. A second system of similar tubes, located in front of the firebox, is connected to the tubes which form the firebox. Steam, at a pressure of 1,700 lb., is pumped through these two systems of tubes. The circulation of this steam through the tubes raises the temperature of the steam to about 843 deg. F.

About one-fourth of the volume of this steam flows



The steam-circulating pump

to the high-pressure cylinders. The remainder flows to the high-pressure steam evaporator. This evaporator is a drum partially filled with water, and operates at the same pressure as the high-pressure superheater, 1,700 lb. Steam enters this drum through a submerged perforated pipe, and thus evaporates the water in the drum as it gives up its superheat. The circulating pump draws saturated steam from the steam space of the drum, thus continuing the cycle as indicated on the diagram.

The high-pressure cylinders exhaust at about 256 lb. per sq. in. This exhaust steam passes through an oil separator on its way to the heat exchanger, which is a low-pressure boiler and operates at a pressure of about 213 lb. The tubes of this heat exchanger carry the exhaust steam from the high-pressure cylinders. The exhaust steam condenses as it passes through the tubes and the condensate is pumped to the high-pressure steam evaporator through a heater which is heated by the flue gases from the firebox.

The steam generated in the low-pressure heat exchanger is superheated to about 572 deg. F. in a low-pressure superheater which is located between the high-pressure superheater and a feedwater heater. This steam is then carried to the low-pressure cylinder from which it is exhausted in the usual manner. An air heater is located between the high-pressure feedwater heater and the stack which raises the temperature of the air for combustion to about 302 deg. F.

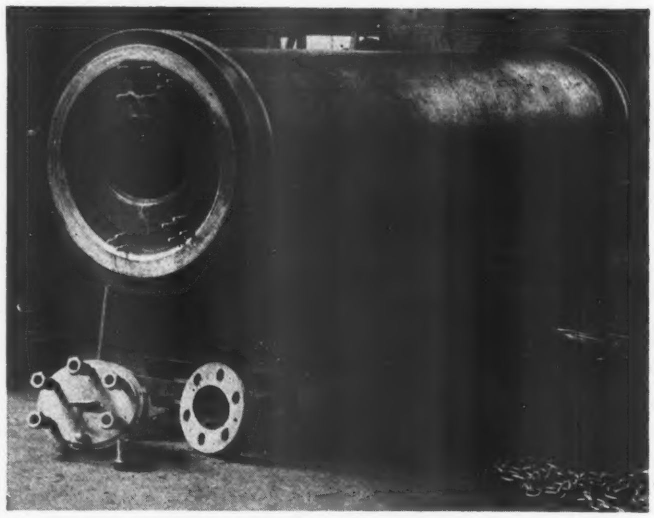
Features of the Closed-Circuit Construction

Feedwater is fed to the boiler through the heat exchanger, with the object of causing the scale to be deposited in the low-pressure boiler. However, owing to the fact that the tubes in the low-pressure boiler are heated with steam, this does not actually take place.

Pumping the steam through the high-pressure circuit requires from one to two per cent of the generated steam. According to statements made by the designers, the use of both high- and low-pressure circuits is perhaps not necessary. This arrangement, however, was chosen in the first locomotive to ensure the elimination of scale deposits in the high-pressure parts of the system. Because the velocity of the water through the high-pressure feedwater heater is high, it is hardly possible that the deposit of scale in the high-pressure evaporator drum would have been heavy and even then would not cause damage because that fire or hot combustion gases do not come in contact with the drum. Furthermore, according to the designers, if the low-pressure boiler had been omitted, the exhaust from the high-pressure cylinder could be taken directly to the low-pressure cylinder and a simpler arrangement could have been used. The inclusion, however, of the heat exchanger insures additional reliability and increased overload capacity which is secured from the storage of heat in the water in the heat exchanger.

Method of Preparing the Locomotive for Service

The method of preparing a locomotive for service is unusual as compared with customary practices. The high-pressure steam evaporator and the steam circulating



Evaporator drum

pumps are supplied with steam from an outside source. The pumps are then started and are kept in operation until sufficient steam pressure in the boiler is secured to continue the operation of the pumps. A fire is then

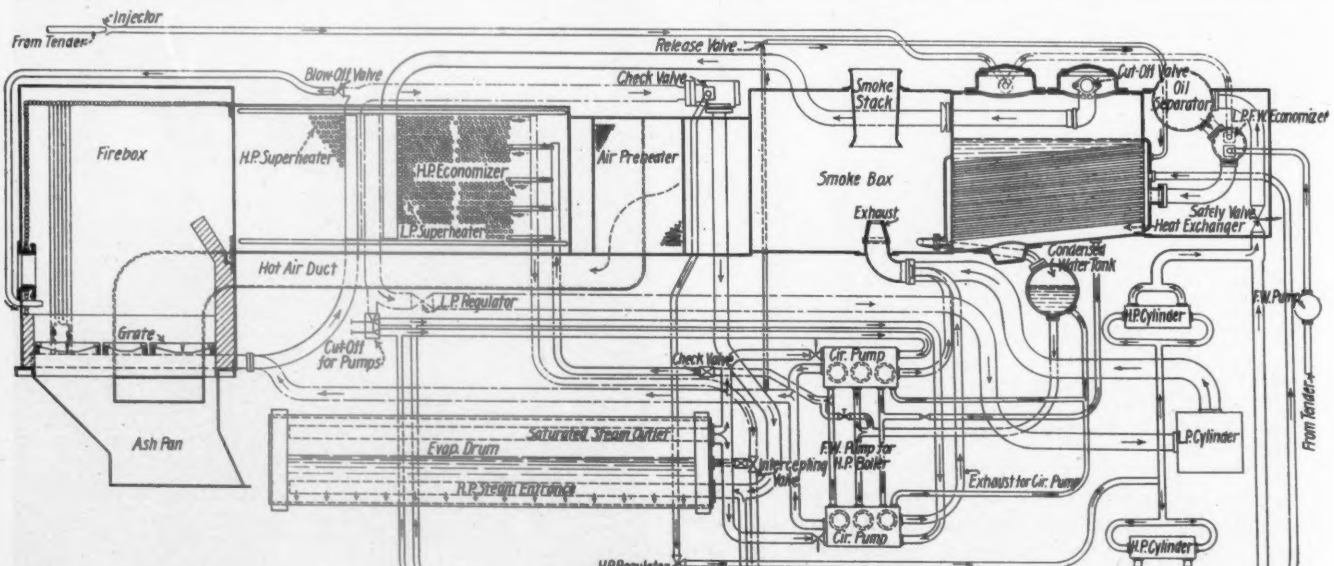
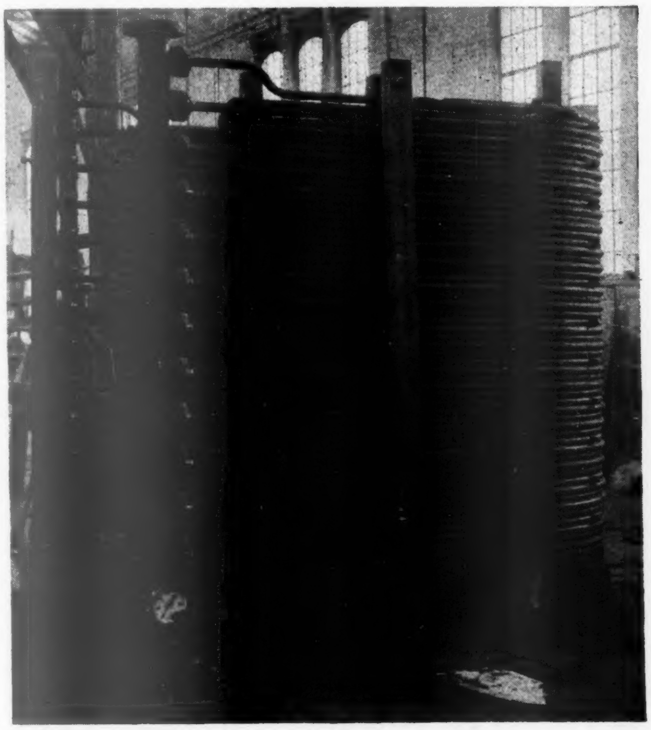


Diagram of the Loeffler principle of steam generation as applied to the 4-6-2 type locomotive for the German State Railways

ignited in the firebox and the outside supply of steam is shut off. The circulating pumps continue to operate as the heat from the firebox raises the pressure in the high-pressure steam circuit to 1,700 lb. The draft on the fire is so regulated that the maximum pressure of 1,700 lb. is not exceeded in the evaporator. Both the evaporator and the heat exchanger of the locomotive are provided with safety valves.

Design and General Arrangement

The design of the running gear, weight, clearance and power requirements of the Schwartzkopff-Loeffler locomotive are similar to that of the 4-6-2 type locomotives standard on the German State Railways. Two nests of high-pressure superheater tubes, the low-pressure heater and the high-pressure feedwater heater, are located in front of the water-tube firebox. A rectangular chamber, the walls of which form a continuation of the high-pressure feedwater heater, surrounds the high- and low-pressure superheaters. The top tier of tubes of this



The firebox tubes—Standing on end in the shop for hydrostatic test

chamber can be removed to facilitate the removal of boiler details. The air heater is located between the high-pressure feedwater heater and the smokebox. Air flows to the heater from both sides and is delivered to the enclosed ash pan through ducts which are located under the deck of the cab. The feedwater dome, scum separator and steam dome for the low-pressure boiler are located in the smokebox. The low-pressure heater and oil separator are placed ahead of these fixtures. A collector for the condensed water which flows from the tubes of the low-pressure boiler is placed below the heat exchanger. The drum of the steam evaporator is located under the feedwater heater ahead of the firebox. This drum is 13 ft. 5¼ in. long and has an inside diameter of 33 in. It is made from nickel-chrome steel and has a wall thickness of 1¼ in.

The boiler is provided with two steam circulating pumps each of which has a pumping capacity to circulate 75 per cent of the amount of steam required for the maximum load. The circulating pump has three cylinders and is coupled to the high-pressure feedwater pump. It is operated with low-pressure steam.

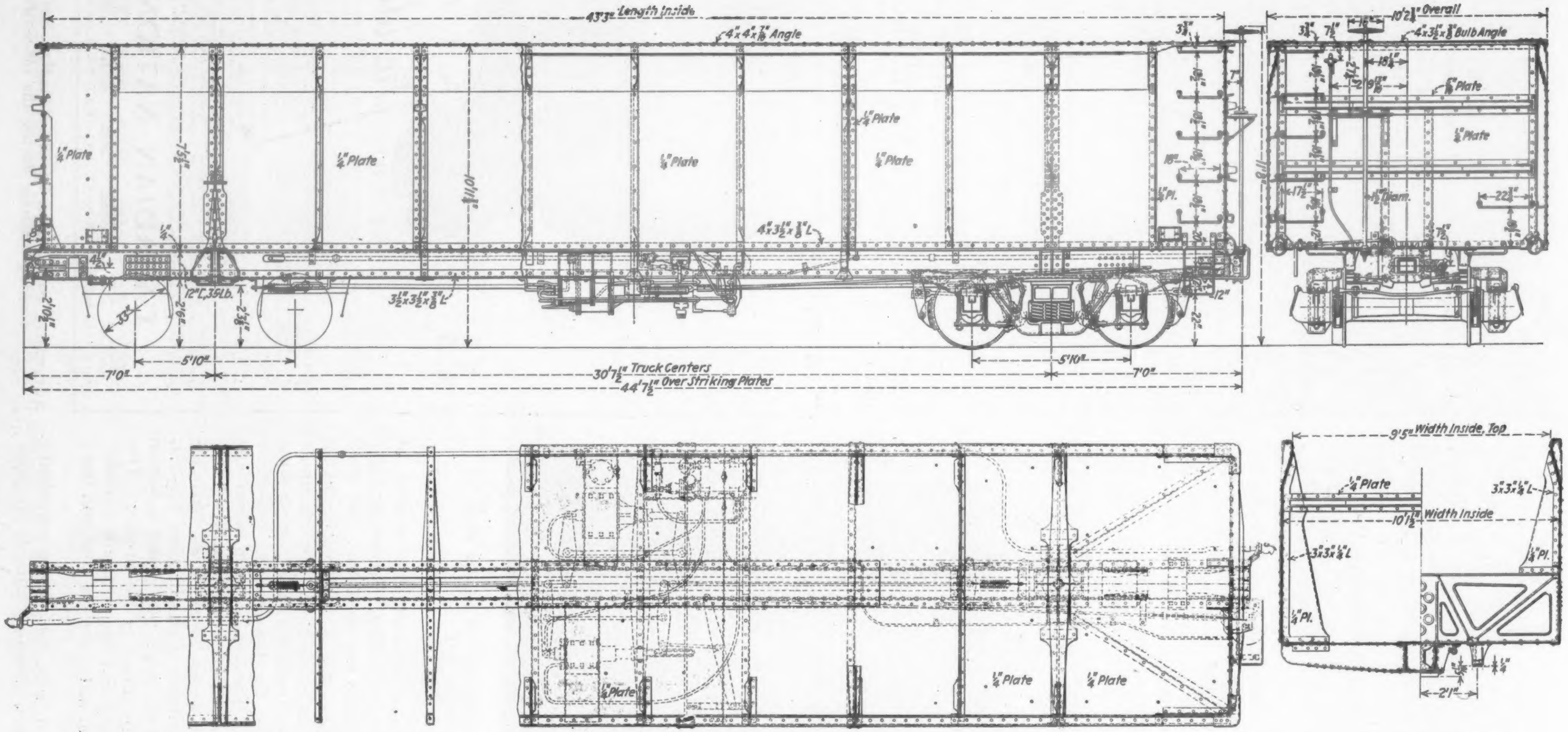
Expected Economies

It is theoretically estimated that the Schwartzkopff-Loeffler locomotive will save 47 per cent in fuel as compared with the modern locomotive of similar type. From these theoretical calculations a fuel economy of from 40 to 45 per cent is expected. Although the design is somewhat complicated because of the increased working pressure, the construction of the locomotive affords at least the same safety in operation as locomotives of customary design, if not a greater safety. It is believed that the small tubes cannot cause damage if any should happen to burst and furthermore the fact that the wall of the unfired high-pressure evaporator is designed without pipe joints is also a feature for increased safety of operation. The designers also believe that the maintenance of the boiler will not be excessive because pipe coils of straight design are used throughout. The most expensive part of the boiler is the high-pressure evaporator on which no maintenance work should be necessary. It is hoped that the saving effected in fuel consumption will not be offset by the expenses for first cost and maintenance.

The locomotive was first tested at the plant of the manufacturers at Berlin-Wildau and was later tested at the locomotive testing plant of the German State Railways at Berlin-Grunewald. It is now being tested in road service.

* * *

Advertising poster used by the Canadian National for attracting business during the off-season



Length over striking plate	44 ft. 7½ in.	Distance from center to center of trucks	30 ft. 7½ in.
Length inside of car	43 ft. 3 in.	Truck wheel base	5 ft. 10 in.
Width of car overall	10 ft. 2¾ in.	Journals	6½ in. by 12 in.
Width of car inside	10 ft. 1½ in.	Weight	59,000 lb.
Height from rail to top of side	10 ft. 11¾ in.	Load limit	251,000 lb.
Depth of body inside	7 ft. 5½ in.	Cubic capacity	3,212 cu. ft.
Height from rail to top of brake mast	11 ft. 8 in.	Cubic capacity, heaped	3,703 cu. ft.

General drawing of the Pressed Steel experimental 100-ton coal car

Experimental high-capacity coal car with four-wheel trucks, built by the Pressed Steel Car Company in 1921

Service Record of 100-Ton Car with Four-Wheel Trucks

Pressed Steel experimental car built in 1921 taken in for examination after eight years' service in coal traffic

IN July, 1921, the Pressed Steel Car Company completed a sample coal car which was designed especially for carrying coal to be dumped in a car dumper and with the idea of carrying the greatest amount of coal on two four-wheel trucks. The car is of approximately 200,000 lb. capacity, having a cubic capacity, when heaped, of 3,703 cu. ft. As the car is always emptied in a car dumper, it is not equipped with hoppers or drop doors and is of the flat-bottom gondola type. The light weight of the car, including the two four-wheel cast-steel trucks, is 59,000 lb. and, when loaded with 96 tons, the wheel load on the rail is up to the maximum A.R.A. allowance for axles with 6½-in. by 12-in. journals. These wheel loads are somewhat greater than has been the general practice heretofore and some doubt was expressed as to the satisfactory operation on this account. This sample car has been in service about eight years and so far has given a very satisfactory account of itself. No undue wear has shown up on any of the running gear or other parts. The test shows that it is feasible to make use of cars of this high capacity with four-wheel trucks. The ratio of paying load to total weight of the car loaded to the A.R.A. axle limit is 76.5 per cent. When it is taken into consideration that this car is equipped with Westinghouse empty and load brake on the body and clasp brakes on the trucks, this is a high ratio.

The sides are entirely free from outside side stakes or other projections outside the plane of the side sheets, thus providing for the required cubic capacity in a minimum length and height, a form of construction which has been incorporated in the A.R.A. recommended practice designs for hopper cars. The sides are formed of ¼-in. plates, sloped in near the top at an angle of approximately 15 deg. and then flanged out, overlapping the horizontal leg of the top angle to which they are riveted. With this construction the car is easily cleared of its lading when turned to the proper angle by the dumping machine. The top angles are standard 4-in. by 4-in. by 7/16-in. rolled angles, with the vertical flange outside in line with the plane of the side sheets. Along the bottom the sides are reinforced by 4-in. by 3½-in. by ⅜-in. angles, which also support the floor. Near the ends the side sheets are dropped back into the car to provide space for the ladders and grab irons inside the clearance limits and to afford protection to the ladders in car dumpers and elsewhere. The sides are braced on the inside by eleven ¼-in. gussets on each side extending from floor to top of side and are tied together by two pressed steel crossties extending from side to side near the top.

The ends are made of ¼-in. plates reinforced and stiffened by two pressed steel cross-braces made of 5/16-in. material and a 4-in. by 3½-in. by ⅜-in. bulb angle across the top. The center sills are 12-in., 35-lb. channels, spaced 12⅞ in. apart and extending from end to end of the car. They are reinforced at the bottom by 3½-in. by 3½-in by ⅜-in. angles running from the

rear of one draft rigging to the rear of the other, and meet the A.R.A. requirements of 30 sq. in. in area and ratio of stress to strain .05. The center sills are reinforced at the coupler opening with a cast-steel combined striking plate and carrier iron, making a very substantial arrangement with no chance for the carrier iron becoming loose or the bolt becoming lost. There are three cross-beams in the underframe between the

the car was removed from service and showed very little flowing of the metal.

In addition to the condition of the wheels, a general examination to determine the condition of the car as a whole was also made at the plant of the builder. The four body side bearings were found riding hard on the rollers of the truck side bearings and also showed some crushing at the points of contact with the rollers.

The four-wheel truck, equipped with clasp brakes

bolsters made of pressed steel 12 in. deep, substantially reinforced at the top and bottom, to transmit the load to the sides of the car.

The floor, which is flat throughout its entire surface, is made of ¼-inch. plates and, in addition to being supported by the sills, cross-bearers, etc., is supported and braced by two pressed-steel diaphragms and two 5-in. bulb angles.

The body bolsters are made of cast-steel 30 in. deep, in one piece, located inside of the body and securely riveted to the center sills, floor plates and side sheets.

The trucks are of the four-wheel type, with Buckeye cast-steel side frames and cast-steel bolsters. They are equipped with Stucki roller side bearings, suitable for a 200,000 lb. capacity car and are equipped with clasp brakes applied to all wheels. The inside brake beams are made of 5-in., 10-lb. I-beams. The wheels are rolled steel, 33 in. in diameter. The truck bolsters rest on six double coil springs to the group which set in pressed-steel spring planks.

This car was placed in service on the Virginian in April, 1922, where it remained continuously in service, except during the period October 8, 1923, to December 14, 1923, until it was returned to the McKees Rocks (Pa.) plant of the builders in December, 1929. During this time the car made 92,851 miles, an average of 11,606 miles per year, or 950 miles per month. The average load during this period ranged from 95 to 96 tons.

During nearly eight years of service on the Virginian three pairs of wheels were removed due to flange wear. These wheels were reapplied after being turned. This performance is said to compare favorably with the wheel replacements necessary on the 120-ton cars equipped with six-wheel trucks, many of which are in service on that road.

All wheel treads were in good condition at the time

The floor sheets, which were originally of ¼-in. plate, have been reduced considerably by corrosion, the thickness at the drain holes at the time of the examination being approximately ⅛ in. Similarly, the edges of the inside gusset braces had been reduced to ⅛ in. in thickness. The entire car was in serviceable condition.

* * *

The "Oregon Pony" first locomotive used in the Northwest as it now stands in front of the Union station at Portland

This locomotive was brought to Portland, Ore., by steamship from San Francisco, Cal., where it was built in March, 1862. It was used in freight and passenger service from May, 1862, to April, 1863, between Bonneville, Ore., and Cascade Locks over a line which is now a part of the Oregon, Washington Railroad & Navigation Company

Improving Draft Efficiency

The annular-ported exhaust nozzle with a suitably proportioned stack reduces back pressure

By Geo. W. Armstrong

THE jet of steam emerging from the exhaust nozzle of the locomotive induces motion in the combustion gases by frictional contact, then by eddy entrainment enfolds and ejects them. This process creates a vacuum in the front end, producing the velocity head which carries the air through the grates and fire bed and the combustion gases over the arch, through the tubes and flues and around the diaphragm, table plate and short diaphragm. Having induced motion and entrained the gases, the emerging jet has to impart sufficient energy to these gases to eject them through the stack and still retain sufficient energy, or velocity head, in the combined steam and gas exhaust jet to produce a dynamic pressure at the top of the stack for ultimate disposal of the exhaust.

The exhaust jet has been called upon in recent years to perform much more work than in earlier years. The development of a self-cleaning front end by the imposition of a necessarily high velocity under the table plate added to the increase in draft requirements. Later, the use of the arch to increase combustion efficiency added to the gas travel and produced an additional baffle in the gas flow, which absorbs energy. The superheater added extra frictional resistance, not only through the tubes, but through the superheater damper. Many roads are doing away with the damper baffling resistance, but the other resistances are those with which we must contend, owing to the value of the devices in improving boiler and locomotive efficiency.

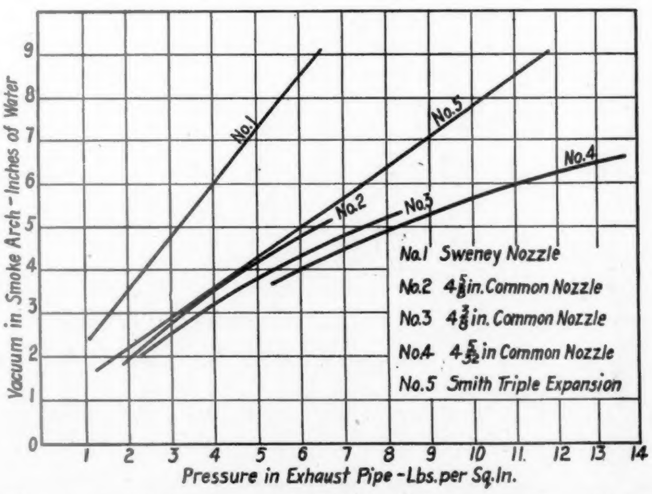


Fig. 1—Draft diagrams of the Sweney and other exhaust nozzles tested at the University of Illinois in 1898

Faced with requirements which must be met in draft losses in disposing of gases in order that the ultimate end may be attained, of creating a vacuum in the firebox which will supply sufficient air for combustion, we must realize that any further attempts at improvement in draft appliances must lie in the nozzle and stack combination.

Any reduction in locomotive back pressure must, of necessity, decrease the resistance against which the expanding steam must work, and, therefore, increase

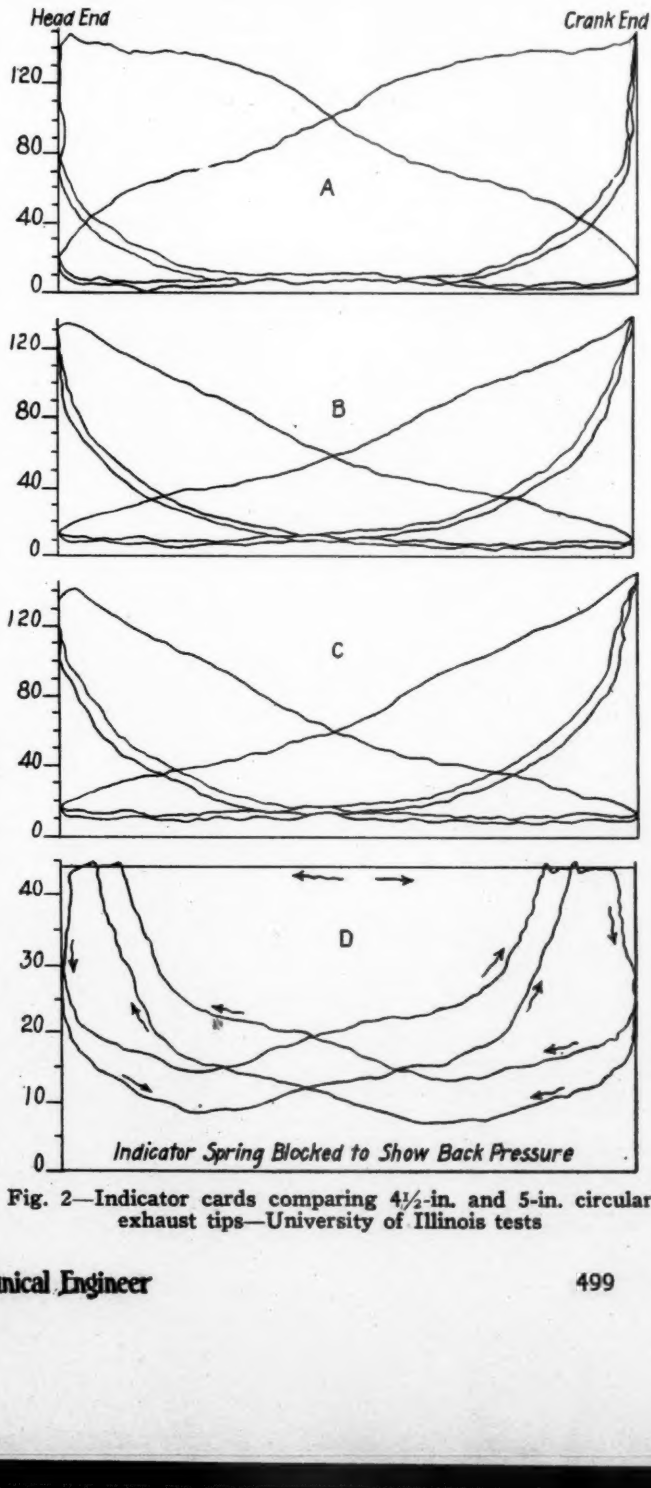


Fig. 2—Indicator cards comparing 4½-in. and 5-in. circular exhaust tips—University of Illinois tests

the power output of the locomotive. The exhaust pressure of a locomotive with any given nozzle outlet area is a function of the steam flow. With a given position of engine working or constant steam flow, if we enlarge the nozzle outlet, we will effect a reduction in exhaust pressure, but if the draft-producing characteristics, or efficiency, of the steam jet is not improved, it will follow that a reduction in draft will result for any given position of engine working or steam flow if the only change in striving for back-pressure reduction is in enlargement of nozzle area.

Consequently, unless a locomotive has been overdrafted, a given type of nozzle cannot be opened up without under-drafting the locomotive. In aiming for the lowest possible working back pressure, we must, therefore, develop the nozzle of highest draft-producing efficiency and combine with it the stack which serves the purpose of directing and facilitating gas and steam ejection with the minimum of frictional resistance and yet serves as a confining envelope to prevent air infiltration from destroying the smokebox vacuum.

An increase in the ratio of jet periphery to its area, as well as a judicious "nicking" of this periphery adds to jet efficiency. This theoretical improvement has been practically embodied in the annular-ported nozzle, and in road tests as well as in standing tests, has amply demonstrated that its theoretical advantages are realized.

Origin of the Annular-Ported Nozzle

In 1899 a nozzle similar to the annular-ported nozzle, developed by Don Sweney, then a graduate student at the university and now with the Chicago, Burlington & Quincy, was tested at the University of Illinois. A description of these tests appears in the Railroad Gazette of June 16, 1899, pages 428-429.

The engine on which this nozzle was tested—Illinois Central No. 420—had 19-in. by 26-in. cylinder, 56½-in. drivers, a grate area of 26.4 sq. ft., a tube heating surface of 1,358 sq. ft., a firebox heating surface of 162 sq. ft., carried 180 lb. pressure, and had a smokebox about 62 in. in diameter.

A comparison of the draft-back pressure relations of the Sweney nozzle and round-tip nozzles, developed in these tests, is shown in Fig. 1. A study of indicator cards in Fig. 2 taken under as near as possible identical conditions with an adjustable round-nozzle arrangement giving quick changes from 15.9 to 19.6 sq. in., the areas of the round and Sweney nozzles, respectively, show plainly the gain in power through reduced back pressure.

A modification of the annular-ported and the Sweney

Summary of Standing Tests of U.S.R.A. 2-8-2B Type Locomotive

Test conditions	Test No.	Boiler pressure, Lb. per sq. in., In cab	Boiler pressure, Lb. per sq. in., Steam pipe	Back pressure, In. hg.	Back pressure, Lb. per sq. in. gage	Superheat. temperature of pyrometer	Draft, Inches of water, Front of netting	Draft, Inches of water, Back of netting	Draft, Inches of water, Under table-plate	Draft, Inches of water, Back of diaphragm	Draft, Inches of water, Fire box	Lb. of coal fired	Lb. of water evaporated	Water evap. lb. per lb. of coal	Coal fired per sq. ft. grate per hr.	Remarks
7½-in. Cross-bridge	1	189.8	....	4.09	4.45	525.5	2.83	2.87	2.5	...	1.02	4485	25958	5.80	63.3	
nozzle, 18-in. stack.	2	190.7	....	6.05	6.65	550.0	4.14	4.03	3.6	...	1.02	4875	29417	6.03	68.8	
Extension 15¾ in.	3	190.0	181.5	8.00	8.5	549.2	5.25	5.35	4.32	...	1.20	5000	34877	6.97	70.6	
above nozzle.	4	188.6	179.1	10.0	10.25	552.2	6.29	6.15	5.23	...	1.62	5600	39348	7.02	79.1	
	5	189.6	179.1	12.0	12.21	570.0	7.63	7.35	6.36	...	2.32	6603	42752	6.47	93.2	
7¾-in. Cross-bridge	6	189.8	....	8.0	8.6	540.0	5.3	4.9	4.2	...	0.98	5300	35295	6.66	74.8	
nozzle, ½-in. bars,	7	190.3	178.0	11.95	12.6	581.2	7.67	7.34	6.2	...	1.41	7600	42959	5.65	107.3	
18-in. stack.	8	191.1	184.0	3.99	4.27	527.5	3.1	3.08	2.6	...	0.78	3300	25365	7.69	46.6	
12-in. Annular-ported	9	190.0	183.4	4.03	4.14	534.6	2.8	2.98	2.61	...	0.58	3300	26206	7.94	46.6	
nozzle, 4¼-in. plate,	10	189.8	178.5	9.99	10.23	576.5	6.5	6.75	5.65	...	1.14	6000	40082	6.68	84.7	
18-in. stack.	11	190.75	181.2	8.00	8.14	556.1	5.25	5.60	4.58	3.25	1.04	5300	37597	7.09	74.8	
	12	190.6	183.3	5.95	6.09	553.7	4.17	4.36	3.74	2.7	1.02	4562	33790	7.41	64.4	
6¾-in. . Goodfellow	13	191.5	180.5	11.98	12.4	577.0	6.49	6.93	5.43	3.675	1.0	6500	37764	5.81	91.8	
nozzle, 18-in. stack.	14	190.6	183.2	8.03	8.3	572.0	4.77	4.98	4.07	2.84	1.05	4600	31554	6.86	65.0	
	15	192.5	197.3	4.08	4.15	511.2	2.85	2.88	2.52	1.83	1.06	3100	20985	6.77	43.8	
6½-in. Open tip, 18-	16	190.5	182.3	8.03	8.33	557.5	4.4	4.65	3.84	2.74	0.82	4900	33418	6.82	69.2	
in. stack.	17	190.2	180.7	12.06	12.44	572.5	6.24	6.59	5.39	3.82	1.35	5700	38364	6.73	80.5	
	18	191.0	185.9	4.03	4.22	518.8	2.88	2.75	2.44	1.64	0.69	3500	24836	7.09	49.4	
	19	190.5	182.2	10.05	10.25	564.3	5.86	5.97	4.99	3.58	1.39	5900	34544	5.85	83.3	Fire clinkered.
12-in. Annular-ported	20	190.5	181.5	8.08	8.2	601.5	7.7	7.5	6.41	4.42	1.22	5100	36475	7.15	72.0	
nozzle, 4¼-in. plate,	21	190.2	184.9	4.03	4.14	564.9	4.35	3.93	3.54	2.43	0.96	3600	26892	7.47	50.8	
20-in. stack.	22	187.8	174.2	12.03	12.47	622.2	11.02	10.08	8.95	6.1	1.8	9200	45182	4.91	130.0	
12-in. Annular-ported,	23	188.7	179.6	8.05	8.22	599.5	6.66	6.39	5.38	3.78	1.06	5500	37743	7.04	77.7	
no plate, 20-in.	24	190.2	183.2	4.0	4.1	548.0	3.85	3.7	3.05	2.15	0.73	3500	28042	8.01	49.4	Raised draft
stack, draft sheet																sheet after
20 in.																Test 24.
12-in. Annular-ported,	25	189.8	178.4	8.04	8.38	587.8	6.46	6.40	5.49	3.74	0.89	6000	38242	6.37	84.7	
no plate, 20-in.	26	189.1	176.3	11.98	11.95	607.7	8.65	8.52	7.47	5.05	1.43	8300	48408	5.83	117.2	
stack, draft sheet	27	189.5	185.0	4.0	4.05	565.0	4.07	3.64	3.41	2.37	1.01	4100	28346	6.91	57.9	Superheater
raised to 21½ in.																damper.
12-in. Annular-ported,	28	190.3	180.8	8.09	8.28	610.0	6.12	6.05	5.19	3.91	1.28	6100	38108	6.25	86.1	Removed
no plate, 20-in.	29	189.8	177.8	12.05	12.09	620.2	8.02	8.00	6.89	5.09	1.65	8400	45432	5.41	118.6	after 27.
stack, 21½-in. draft	30	190.5	184.8	4.03	4.12	574.5	3.66	3.3	3.05	2.28	0.82	4000	28077	7.00	56.5	
sheet, no damper.																
12¼-in. Annular-port-	31	190.0	178.9	8.02	8.08	578.7	6.28	6.62	5.56	4.05	1.24	7000	39373	5.62	98.8	
ed, 4¼-in. plate.																
12½-in. Annular-port-	32	190.3	180.5	8.04	...	586.6	6.1	6.29	5.29	3.95	1.28	6300	43038	6.83	89.0	
ed, 6-in. plate, 20-in.	33	191.0	184.7	4.09	...	554.3	3.39	3.63	3.12	2.37	1.07	3950	26071	6.6	55.8	
stack, 21½-in. draft	34	190.6	176.5	12.1	...	623.5	8.25	8.7	7.26	5.34	1.52	8400	45824	5.45	118.8	
sheet, no damper.																
12-in. Annular-ported,	35	190.2	181.9	8.11	...	594.6	6.67	6.9	5.77	4.19	1.12	6300	37659	5.98	103.5	Dirty coal,
3½-in. plate, 21½-	36	189.5	178.5	12.02	...	622.1	9.61	9.87	8.61	6.42	2.40	8500	44873	5.28	120.0	high slack,
in. draft sheet, no	37	190.5	178.4	10.05	...	610.4	8.09	8.21	7.17	5.16	1.51	7900	42664	5.40	111.6	slate, built
damper.	38	191.2	183.6	4.07	...	563.1	3.65	3.93	3.44	2.47	0.97	4500	37747	6.17	63.5	up.
	39	190.3	181.6	6.09	...	595.7	5.99	6.27	5.55	4.24	2.06	5650	32313	5.72	79.8	

Throttle wide open for all tests.

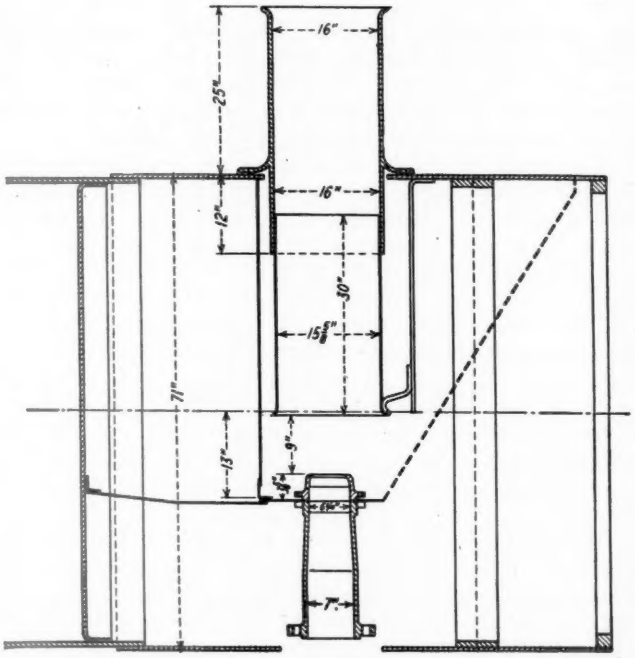


Fig. 3—Standard front-end arrangement—Class K-8-c locomotive

nozzle has been used for years on the Norfolk & Western with marked success and in the effort to improve the modern locomotive extensive tests are being conducted by other roads in adapting further minor modifications of the basic principle.

A Consolidation locomotive, road class K-8-c, the characteristics of which are given in the table below, was subjected to standing tests, comparing the annular-ported nozzle with the regularly used 5¾-in. four-projection nozzle and the former standard circular nozzles, 5¼ in., 5⅜ in. and 5½ in. in diameter.

The standard front-end arrangement for these locomotives with the four-projection nozzle is shown in Fig. 3, while that for use with the annular-ported nozzle is shown in Fig. 4.

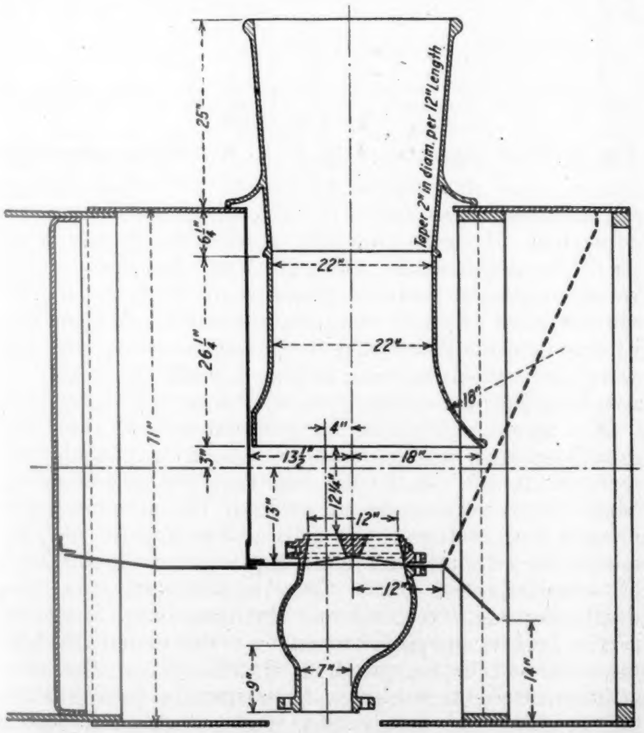


Fig. 4—Front end of class K-8-c locomotive with the annular-ported nozzle

The annular-ported nozzle, Fig. 5, had an outside

Principal Dimensions of the Consolidation Locomotive K-8-c

	K-8-c
Cylinders	24 in. by 30 in.
Drivers	61 in.
Weight on drivers	197,100 lb.
Boiler diameter	68⅝ in.
Tubes	202—2 in. by 14 ft. 9 in.
Flues	30—5⅜ in.
Heating surface, tubes and flues	2,186 sq. ft.
Heating surface, firebox	172 sq. ft.
Arch tubes	25
Heating surface, total	2,383 sq. ft.
Grate area	53.4 sq. ft.

diameter of 10½-in. and, with a 3½-in. plate applied at the center, had an open area of 30.6 sq. in.

Experience on the road has shown that a nozzle of the round type larger than 5¼ in. would not give a satisfactory steaming engine. The relation between back-pressure and draft with this nozzle for the steam flow at any given engine working was the minimum that would support the combustion required to produce that amount of steam. The area, for example, with the 5½-in. nozzle would be increased over 10 per cent, which would result in a corresponding loss in back pressure. Since the draft efficiency is not increased by the 5½-in. nozzle over that with the 5¼-in. nozzle, the draft produced by any position of engine working would be decreased and the engine would not steam.

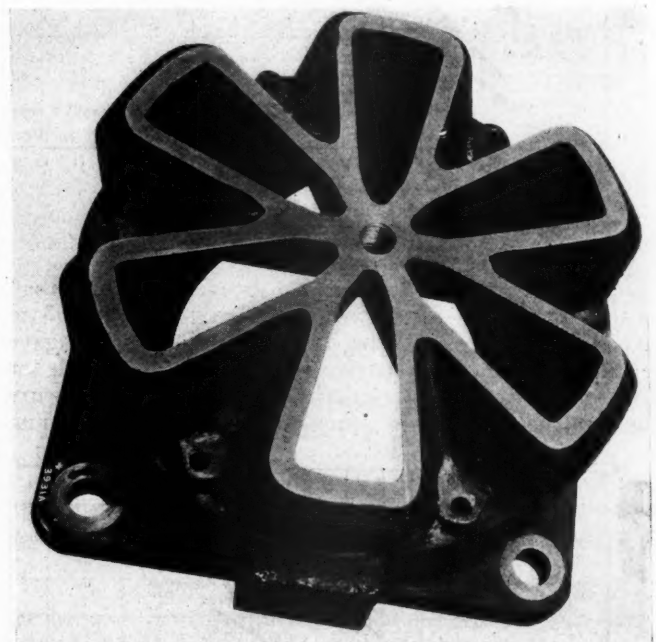


Fig. 5—The annular-ported nozzle

The Relative Areas of the Nozzles Tested

	Net area, sq. in.
10½-in. annular-ported nozzle	30.6
5¾-in. four-projection nozzle	24.0
5½-in. round nozzle	23.578
5⅜-in. round nozzle	22.691
5¼-in. round nozzle	21.648

The 5¾-in., four-projection nozzle, on the other hand, has an area of 24 sq. in., as compared with that of 21.648 sq. in. for the 5¼-in. nozzle. It will be noted that the draft efficiency is considerably greater and,

therefore, ample to support a higher rate of combustion. Experience on the road has shown these engines to be more reliable steamers than those with the round nozzle, and the draft relations in Fig. 6 show why such a result is to be expected.

The value of this improved draft efficiency on boiler

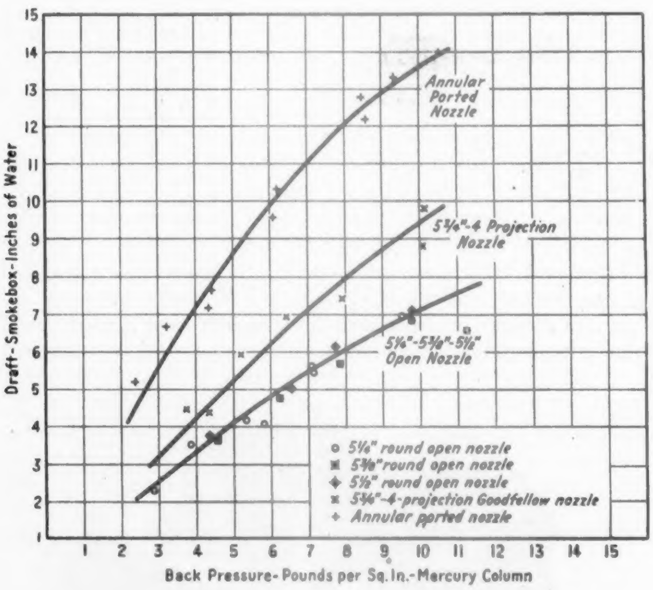


Fig. 6—Draft diagrams of the K-8-c locomotive

output is illustrated in Fig. 7. It will be noted that, within the range of engine operation tested, *i.e.*, 3 to 10 lb. back pressure, the four-projection nozzle gave greater evaporative capacity than the round nozzle or the same evaporative capacity with less back pressure against the pistons—in other words—a freer steaming

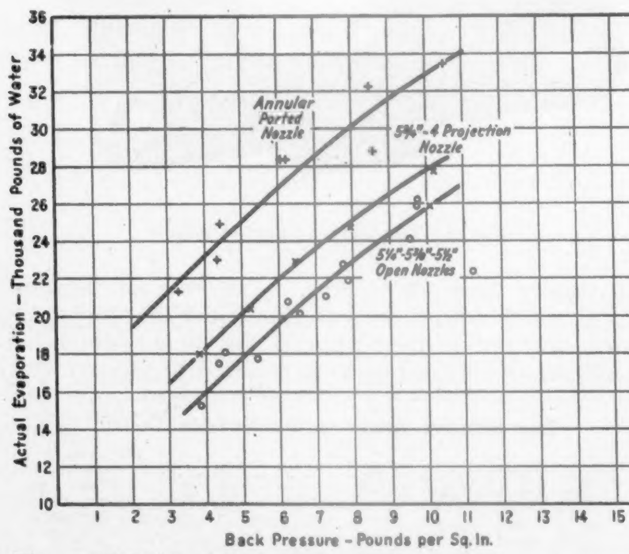


Fig. 7—Relation between evaporation and back pressure-K-8-c locomotive

engine, with slightly greater power output for a given cut-off and boiler output.

The reduction in back pressure and increase in boiler capacity effected by the annular-ported nozzle with an open area of 30.6 sq. in. is much greater than that effected by the four-projection nozzle.

An extensive study of the annular-ported nozzle in comparison with other types of nozzles on a U.S.R.A 2-8-2-B locomotive was conducted by the standing-test method and it conclusively indicated the superiority of the annular-ported nozzle. The same improvements noted during the standing tests were observed in subsequent road service. The engine has been a free steamer and, due to the decreased back pressure, handles locomotive tonnage at somewhat higher speeds.

The curve of draft relations or draft efficiency, Fig. 8, shows very clearly that the stack plays a very important part in the efficiency of any nozzle. It will be noted that the annular-ported nozzle used with the original stack, which had an 18-in. choke and very little taper, was no more efficient than the cross bridge nozzle. On the other hand, when the stack was changed to conform with the nozzle with a 20-in. choke and a total taper of 2 in. in 12 in. an increase of draft from 6.5 in. to 9.3 in., with 10 lb. back pressure, was effected. In the final arrangement the front-end draft was reduced and the draft back of the diaphragm and in the firebox was slightly increased by removing the front-end damper.

Before concluding the series of standing tests on the U.S.R.A. 2-8-2-B, several changes were made in the diameter of the annular-ported nozzle to develop the effect of larger and smaller stacks. These tests will be found in the table which gives the average results for the entire series of tests. The original 12-in. annular-

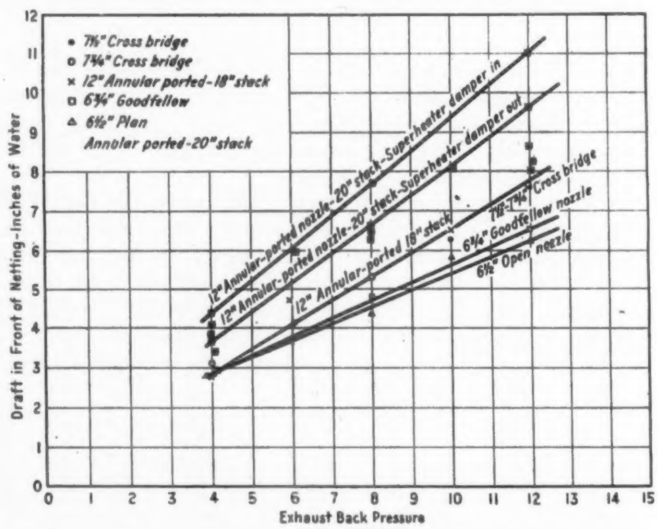


Fig. 8—Draft diagrams of U. S. R. A. 2-8-2-B locomotives

ported nozzle was faced to $12\frac{1}{4}$ in. and $12\frac{1}{2}$ in., the equivalent of decreasing the stack size (tests 31 to 34). Another nozzle was cast with the cores altered so as to give an outside diameter of $11\frac{1}{4}$ in., thereby obtaining the effect of enlarging the stack. A short trial of this nozzle showed that the results in draft efficiency were so far below those obtained with the 12-in. annular-ported nozzle that hour tests were not made of it.

As a final check on the facts developed with the 12-in. annular-ported nozzle, another nozzle was made and tests 35 to 39 run to develop the final relationships. Short tests were made of each of the annular-ported nozzles with different size plates from $2\frac{3}{4}$ in. to 5 in., and it was found that with a given outside diameter of annular-ported nozzle there is practically the same draft efficiency, irrespective of the open area. However, as the area is changed it must be realized that the back pressure will be increased, or decreased, for the same position of engine working. Consequently, having found the condition of nozzle and stack combination which gives the best improvement in efficiency of draft pro-

(Concluded on page 507)

Car Men Addressed by T. C. Powell

M.C.B. and S. convention in Detroit hears plea for the removal of railroad "stumbling blocks"—Association votes to change its name

AT the second annual convention of the Master Car Builders' and Supervisors' Association, held at the Book-Cadillac Hotel, Detroit, Mich., August 26 to 28, inclusive, the members were unanimous in voting to change the name to Car Department Officers' Association. Following a brief opening address by President C. J. Wymer, superintendent of the car department of the Chicago & Eastern Illinois, T. C. Powell, president of the Chicago & Eastern Illinois, presented the outstanding address of the convention on "Stumbling Blocks."

Other speakers and subjects presented at the early sessions of the convention included J. S. Scheidel, district superintendent car repairs, North American Car Corporation, Tulsa, Okla., "How can the Railroads Improve the Service Rendered to Private Line Cars"; L. R. Wink, assistant superintendent car department, Chicago & North Western, "Systematic Car Repairs"; C. R. Megee, district manager, A.R.A., Car Service Division; W. S. Topping, Bureau of Explosives. Abstracts of the individual addresses and committee reports will appear in this and subsequent issues of the *Railway Mechanical Engineer.*

Stumbling Blocks

By T. C. Powell

President, Chicago & Eastern Illinois

I am glad to be here for two reasons; first, because an officer of the Chicago & Eastern Illinois is president, this year, of your association, and, second, because I want to take this opportunity to make certain comments as to the railroad equipment for which you are to some extent responsible.

I started in the traffic department, and I do not hesitate to say that it is the ambition of the members of that department to secure more freight than the car department can furnish equipment for, in other words, nothing gives them more pleasure than a temporary car shortage, but it must be very temporary and must not last more than a few hours. A shortage of cars for a brief space is sometimes thought to be a proof of traffic energy; but neither the traffic department nor any member of it can work alone with any continued success, because today more than ever there are active competitive forces which are trying to drive remunerative traffic into channels other than over the railroads.

I shall discuss some of the faults which have become "stumbling blocks" in the way of successful traffic solicitation. [Mr. Powell here explained at some length the influence of excessive temperatures, dirt and noise in discouraging summer passenger travel, for example, and urged the use of the most modern and effective insulating and ventilating media to overcome this difficulty. He mentioned the damage claims resulting from the use of improperly designed and maintained refrigerator cars, coal cars with hopper doors which are not tight, and the economic loss attendant on the use of non-standard stock cars, box cars, etc.—EDITOR.]

Standard Car Specifications Adopted

In 1923, the railroads adopted certain recommended dimensions for the standard single-sheathed box car, including the outside dimensions, and which resulted in the following inside dimensions: Inside width 8 feet six inches; inside height, 8 feet six inches, and inside length, 40 feet six inches.

In 1925, the railroads adopted the recommended dimensions and specifications for the standard double-sheathed box car, including the outside dimensions, and which resulted in the following inside dimensions: Inside width, 8 feet 7¾ inches; inside height, 8 feet six inches, and inside length, 40 feet six inches.

The only difference between the two as to the inside dimensions is in the width, the recommended specifications for the standard double-sheathed box car having resulted in an inside width 1¾-in. greater than the inside width of the standard single-sheathed box car.

Perhaps this difference was accidental but it may be worth pointing out that no car has been constructed in the last ten years on these exact inside dimension specifications.

From a report which I have prepared based on comprehensive information furnished by the car manufacturers, I find that in 1922, cars less than 36 ft. long and less than 8 ft. 6 in. wide were constructed. Commencing in 1920, a number of orders for cars 36 ft. long were placed, with dimensions which varied from 8 ft. 6 in. to 8 ft. 9 in. inside width and 8 ft. ¼ in. to 8 ft. 7⅞ in. high. As late as 1922 and 1923, 2,000 cars were built of the following dimensions: 36 ft. ½ in. long; 8 ft. 6⅛ in. wide, and 7 ft. 8 in. high.

In 1921 and as late as 1929, some cars were built just under 40 ft. long, the height ranging from 8 ft. ½ in. high to 8 ft. 7$\frac{1}{16}$ in. high.

Please bear in mind that Rule 34 provides that fractions of an inch will not be counted in computing length of cars; also that the increases in the minimum weights to be charged for commence with "cars over 36 ft. 6 in." long and range up to "cars 50 ft. 6 in." in length.

You will see from this that a car that is 39 ft. 10⅛ in. long costs the shipper the same as if it had been 40 ft. 6 in. long. The shipper probably gets no actual use out of the 4⅛ in. extra length, whereas he might get some use out of an extra foot in length without paying any more for it.

One would suppose that a car 50 ft. 6 in. long was the extreme length necessary to accommodate the public, but in 1930 one order has been filled in which the

cars measure 50 ft. 8⅜ in. long inside, 8 ft. 1 in. wide and 10 ft. high, with double doors. The curious thing is that many of the cars which measure 50 ft. 6 in. long inside otherwise range in width from 9 ft to 9 ft. 3 in., whereas this particular car is only 8 ft. 1 in. wide and thus has less cubic capacity than the other 50 ft. 6-in. cars referred to.

I think you should also know that one part of Rule 34 reads as follows: "When a shipper orders a car over 36 ft. 6 in. in length for articles subject to Rule 34 and a car of the length ordered cannot be furnished within six days after the receipt of the order, the carrier will furnish a longer car or two shorter cars" (under certain conditions), so you see that the carrier who constructs a car of an odd length is probably paying for the experiment, and you can also see that there being no continuity or harmony of purpose in ordering cars for these varying dimensions the classification becomes more and more complicated and there is more and more excuse for appealing to the I.C.C. for further concessions.

There was at one time a restriction upon the size of cars but those restrictions are gradually being removed by the rebuilding of bridges and by the elimination or reconstruction of tunnels. This is still further demonstrated by the fact that in the last ten years, and even in the last two or three years, thousands of cars 40 ft. 6 in. long, 9 ft. wide and 10 ft. high, inside, have been turned out by the builders. In fact, the largest car in any one series, based on cubical capacity, is 50 ft. 6 in. long 9 ft. 2 in. wide and 10 ft. 2¼ in. high.

I am aware of the fact that the inside dimensions do not always indicate the exact outside dimensions, but the point I am trying to make is that cars are intended to *contain* freight and the shipper has no concern as to the outside dimensions unless those limit the movement of the car.

Perhaps you will say that the extra widths and extra heights are those applied to automobile cars, but the record does not show this.

As late as 1930, some 40-ft. 6-in. double-door automobile cars were built with a width of 8 ft. 9½ in. and height of 8 ft. 7¼ in., and in the same year of 1930 another lot of cars 40 ft. 6 in. long, inside, were turned out, 9 ft. 1 in. wide and 10 ft. 4 in. high and were also designated as automobile cars with double doors.

In conclusion, I give the maximum dimensions, inside, but no two of them belonging to the same car: Length, 50 ft. 8⅜ in.; width, 9 ft. 5 in., and height, 10 ft. 6½ in. All these variations are set forth in the accompanying tables.

Perhaps you will ask why adherence to any particular arrangement of the dimensions of a freight car is so important and I, therefore, call your attention to Rule 34 of the Consolidated Classification. Generally speaking, all items with a specified minimum weight of less than 30,000 lbs., and also those items with a specified weight of 30,000 lb., where that approximates the loading capacity of a 36-ft. car, are subject to Rule 34.

The Interstate Commerce Commission has extended the application of Rule 34 in certain other instances.

Now, the purpose of Rule 34 is to prevent discrimination and at the same time to give the shipper what he asks for and the benefit of what he actually gets and not to charge him for excess capacity when he does not use it. No account is taken of variations of less than one inch, but the pertinent part of Rule 34 is to give the shipper the benefit of the different inside lengths of cars ranging from 36 ft. 6 in., or less, to 50 ft. 6 in., or over. I will not take your time to recite the items that come under Rule 34, but I can say that in a list furnished me by the chairman of the Consolidated Classification Committee, I find something over 800 different items, each one of which is affected by irregularity in the dimensions of box cars.

Many of these items are of great importance and are shipped all over the country, and include agricultural implements, automobile parts of various kinds, bath room and plumbing fixtures, boilers, most of the household appliances, many furniture parts, etc. If the classification minimum is based on an inside length of 40 ft. 6 in. and the actual car is stencilled as measuring 40 ft. 7 in., a shipper pays an excess minimum for that one inch of 200, or 300 lb.

Some commodities may be loaded conveniently in a car 40 ft. 6 in. long but require a greater width than 8 ft. 6 in., or a greater height than 8 ft. 6 in. If every car measured only 8 ft. 6 in. in width and height, the shipper would accommodate himself to that. The variations that I have referred to above are sufficient to justify him in asking for the particular car of which he can make the greatest use.

What I want to emphasize is that the members of the traffic department look upon freight and passenger

Group of officers and members of the M. C. B. and S. Assoc
Included in the center foreground are C. J. Wymer (C. & E. I.), president; K
second vice-president, and A. S. Sternberg (Belt Railway of Chciago), secretary
in the

cars as conveyors or containers for revenue traffic. They feel that the best combined judgment should be exercised in providing the best container for the purpose. A car which, because of its design or lack of consistent design, increases the cost to a shipper or increases the cost of handling on a foreign railroad or which causes unnecessary and profitless empty haul "is worse than a crime; it is a blunder."

In other words, it may be said that every item of car construction which interferes with the easy loading or unloading of freight, the safety of the freight itself or, in the case of passengers, with the comfort of a passenger is a "stumbling block" in the way of a traffic solicitor in his approach to the public.

The Perfect Freight Car

I don't suppose there is a perfect freight car in existence, except, perhaps, the one designed by each particular road, but if we could take the dimensions that would be most acceptable to all shippers I believe that all railroads could use the resulting car. Certainly all roads are now using every kind of box car in creation, and many roads are partners in special cars, having still different dimensions such as refrigerators. With absolute uniform and fixed inside box dimensions, every manufacturer of any kind of container would naturally adjust his product to the box car loading capacity. This would result in simplified package-handling machinery and probably lead to less damage in transit. It would give better loading and save in demurrage, and what would be useful in the long run, obsolete cars which are costly to maintain and are a menace to safety would be penalized.

Suppose we say that a box car inside shall measure in the clear, exactly 40 ft. 6 in. long and exactly 9 ft. 2 in. wide, which are the dimensions of many of the recently constructed cars, and nearly the maximum width. The inside height of this car, if 10 ft. high in the clear, would then be available for many of the 800 plus commodities, and full loading would be assured.

If there could be established a definite relation between the inside dimensions and the cubical capacity of a standard box car, on the one hand, and the inside dimensions and the cubical capacity of a standard refrigerator car, on the other hand, there could also be established a corresponding relationship as to the minimum weights.

There is always a large empty movement of refrigerator cars and there is frequently, at the same time and in the same direction, a movement of empty box cars. Large movements of such perishable traffic to the great centers result in a corresponding movement of refrigerator cars in the reverse direction. A comparatively small increase in the number of refrigerator cars in the reverse direction would operate to reduce the empty movement of the standard box car as at present.

It is possible now to load certain classes of freight in such refrigerator cars, and many of the owning lines do so. The practice could be extended if in the design and construction of such refrigerator cars there could be, as suggested, a relationship between the dimensions of a standard box car and of a standard railroad refrigerator car.

Furthermore, the invention of new systems of refrigeration which are always being held out before us will in themselves suggest a composite car and which will lead toward the reduction of the total sums invested in railroad equipment.

With such uniform and fixed inside box-car dimensions could we not then also say to the manufacturers that these dimensions may be depended upon and that hereafter all boxes, crates, hampers, etc., and every type of container may be designed so that there will be no waste space and that the manufacturer using such containers may put into the car all the weight he is paying for under the classification minimum? This looks like a large job, but consider what the manufacturers of electric appliances have done. Every plug fits into the same outlet and every bulb within household or office range fits into the one-size pocket.

Damage in Transit—Draft Gears

Some tonnage has gone from the railroads to the trucks because owners think there is less delay by truck. What other causes are there? It is your job to analyze that feature, but in addition to the different dimensions to which I have referred, why do not the car doors close in such a way that they are water tight, particularly in a hard rain storm while the freight train is in motion? If rounded edges of certain interior parts of the car reduce damage, why are not these timbers always rounded? Why is it necessary to impose upon the shipper the burden of covering these sharp corners with additional material? In building the inside lining

S. Association in convention at Detroit, Mich.

...sident; K. F. Nystrom (C. M. St. P. & P.), first vice-president; F. A. Starr (C. & O.), ...), secretary and treasurer. F. W. Brazier (N. Y. C.), an honored guest, is also shown in the group.

of the car or putting in the nailing strips, why are not the edges of the upper boards always beveled or rounded so as to reduce the possibilty of chafing. Some one has thought of these things before and someone has adopted the remedies but perhaps they were thought to be "personal peculiarities" and not worth following up. I took occasion to examine a car of watermelons the other day which came through in good condition and largely because the shippers had protected the melons against the ventilator at the end of the car by putting in pads of excelsior. Why were these ventilators designed and installed so as to cut the melons if unprotected? All these are "stumbling blocks" in the way of the traffic department.

In our investigation of some of the claims for alleged rough handling, it was rather alarming to find that in many cases the draft gear was of an obsolete type, that is, of a type no longer made nor advertised. The alarm arises from the conviction that a car so equipped will always be running amuck among cars of good char-

Recapitulation Showing Total Box and Automobile Cars Constructed Each Year Which Conform to Dimensions of Standard Box Cars

Year	Total constructed	Box cars * conforming to single-sheath standard dimensions (40 ft. 6 in. by 8 ft. 6 in. by 8 ft. 6 in.)	Total number auto. cars constructed	Grand total
1920	7,763	......	550	8,313
1921	4,751	......	......	4,751
1922	27,717	2,000	14,410	42,127
1923	22,446	2,000	14,325	37,271
1924	28,725	1,200	12,750	41,475
1925	29,248	2,800	12,832	42,080
1926	17,426	4,027	8,892	26,318
1927	8,690	570	8,120	16,810
1928	10,932	800	4,300	15,232
1929	19,606	304	16,814	36,420
1930	15.165	300	10,050	25,215
Total	192,469	14,001	103,543	296,012

* No box cars were constructed from 1920 to 1930, inclusive, which conformed to double-sheath standard dimensions, 40 ft. 6 in. by 8 ft. 7¾ in. by 8 ft. 8 in.

Percent, total box cars which were constructed to standard dimensions 7.17

	Box	Auto	
Number of different dimensions specified in orders	114	114	Total 228
Minimum length	31 ft. 5¼ in.	35 ft. 9½ in.	
Maximum length	49 ft. 0⅜ in.	50 ft. 8⅜ in.	
Minimum width	7 ft. 5⅜ in.	8 ft. 1 in.	
Maximum width	9 ft. 5 in.	9 ft. 8 in.	
Minimum height	8 ft.	7 ft. 6 in.	
Maximum height	10 ft. 2½ in.	10 ft. 6½ in.	

acter, and perhaps manufacturing a claim on each trip, thus becoming a vicious "stumbling block."

For instance, in checking eight cars recently reported to contain damaged freight, it was found that on four of these cars, that is, 50 per cent of the eight cars taken haphazard from the record of one week, the draft gears were of such obsolete type!

Again, some months ago in carrying on the same investigation we found one car equipped with a draft gear that had not been advertised by the original maker for 18 years. One damage claim, and as a matter of fact the particular damage claim in question would have paid for a modern gear.

I will not undertake to say upon whose shoulders rests the responsibilty for any condition of this kind. My theme today is "Stumbling Blocks," but I do not believe there is any connection between the present investigation which is going on, and the *preservation* of devices so out of date, that even the maker does not think it worth while to urge their purchase and use.

A Few Stumbling Blocks

Traffic may be deflected from a railroad and to some other form of transportation by almost any kind of negligence that results in claims, and this effect is not always limited to the particular road at fault. People in this country do not stay in one place all their lives—they move from one point to another, and sometimes back again, so that the impressions acquired in one place may be carried to an entirely different section and, therefore, the disability of one road may influence the prosperity of others.

A few items in which claims are involved may properly be called "stumbling blocks to the traffic depart-

Partial List of Box and Automobile Cars Constructed by Outside Contractors for the year 1920 to 1930, inclusive

Contractor	Year	No. of cars	Inside Dimensions: Length Ft.	Length In.	Width Ft.	Width In.	Height Ft.	Height In.	Kind of car
4	1920	1,000	40	3	8	7	8	1	Box
6		10	36	0	8	6	8	4½	Box
6		500	40	3½	8	6	9	1⅜	Box
7		500	40	0	8	6½	8	0½	Box
7		500	40	7⅞	8	6⅛	8	8	Auto
9		1,000	36	0	8	6	8	0½	Box
3	1921	100	36	0	8	6	8	6	Box
4		500	36	1	8	6	8	0	Box
7		651	40	0	8	6½	8	0½	Box
9		1,500	40	7⅜	8	6	8	6¼	Box
9		500	39	11⅜	8	6	8	7 5/16	Box
10		1,500	36	1	8	6	7	11½	Box
2	1922	1,000	40	7⅞	9	1⅞	9	10½	Auto
2		10	34	0	7	6	6	0	Box
2		500	40	6	8	6	8	6	Box
2		500	40	0½	8	6	10	0 5/16	Auto
4		1,000	40	6	8	6	8	6	Box
7		500	40	6	8	6	8	6	Box
7		1,000	50	3⅞	9	2	9	10⅞	Auto
8		1,000	40	6	8	6	9	0	Auto
9		200	40	2⅜	9	2	10	2½	Box
9		500	40	7⅞	8	7	7	10½	Box
1	1923	1,500	40	0½	8	6	8	7 5/16	Box
2		2,000	50	3	9	2	9	11⅛	Auto
2		1,000	50	3	9	2	10	0	Auto
2		525	40	6	8	6	10	0 5/16	Auto
4		100	40	6	9	1⅞	9	10⅝	Auto
4		500	36	1	8	6	8	0	Box
7		250	40	6	9	2	9	8	Auto
7		300	40	0	8	7	7	9¾	Box
7		1,000	40	6	8	6	9	0	Box
9		1,000	40	7⅞	8	7	7	10¼	Box
9		500	40	0½	8	6½	7	8	Auto
9		500	40	7⅜	8	6	8	6	Box
9		1,700	40	2⅞	8	6⅜	8	4	Box
1	1924	500	50	0⅜	9	0	10	0 5/16	Auto
2		1,000	40	9	8	6⅛	8	8½	Box
2		250	40	6	8	11	10	0	Auto
3		250	40	6	8	6	9	3	Auto
4		500	40	6	8	6	8	6½	Box
1	1925	500	40	6	8	6	8	7 13/16	Box
1		1,000	40	6	8	6	8	7	Box
2		900	50	6	9	2	10	1⅝	Auto
2		1,000	40	6	8	6	8	6	Box
2		500	40	6	8	6	10	0	Auto
2		50	40	6	8	6	10	0	Box
2	1926	500	40	6	8	6	8	6	Box
2		500	40	6	8	6	8	6	Box
2		500	40	6	8	7¾	8	7½	Box
2		700	50	3⅞	9	2	10	0⅞	Auto
3		100	40	6	8	6	8	7⅜	Box
1	1927	500	40	1⅜	8	6	8	1	Box
2		250	40	6	9	3	9	3	Auto
2		500	40	6	8	7¾	8	7	Box
3		200	40	6	8	6	8	7⅜	Box
4		750	40	6	8	11	10	0	Auto
4		300	50	0	9	0	10	0	Auto
4		500	40	6	9	0	9	0	Box
6		500	40	6	8	9⅛	8	7⅜	Box
6		10	40	6	8	9⅛	8	7⅜	Box
1	1928	1,250	40	6	8	9	9	3 5/16	Box
1		75	40	6	9	2	10	0 5/16	Box
2		500	40	6	9	0	10	0 5/16	Auto
2		500	40	6	8	6	8	11¼	Box
2		500	50	6	9	2	10	0	Auto
2		500	40	6	8	6	8	6	Box
2		500	40	6	9	2½	10	0¾	Auto
1	1929	950	40	6	9	0½	10	0 5/16	Auto
1		50	40	5¼	9	0½	10	0 5/16	Auto
1		50	40	6	9	0½	10	0 5/16	Auto
2		700	40	6	9	2	9	6¾	Box
2		4	40	6	8	6	8	6	Box
2		500	40	6	9	2½	10	0¾	Auto
4		200	40	6	9	0	10	0	Auto
4		750	40	6	9	0	10	0	Auto
1	1930	650	40	8¾	9	1	10	0 5/16	Auto
1		350	40	6 13/16	9	1	10	0 5/16	Auto
2		500	40	6	8	9⅛	8	8	Box
2		1,000	40	6	9	2	9	6¾	Box
2		300	50	6	9	1	10	2¼	Auto
2		500	40	6	9	2	9	6	Box

ment" and may divert freight not perhaps to another railroad but to one of the competitors of all the railroads, are:—Refrigerator cars not fully insulated; defective draft gears, the effect of which may sometimes be defined as rough handling; leaky roofs; car doors badly designed, resulting in damage while in transit; sharp corners among the inside members which might easily be rounded.

If you have listened to these remarks, I know very well what is in the mind of nearly every man in the room, and that is that if the management of his particular company would allow him to spend enough money he would show the world how freight cars and passenger train cars should be designed, built and maintained. Therefore, I make a slight reference to shop equipment.

In the same issue of Railway Age in which I saw my name in print as being on this program, there was an editorial which was headed "Why Neglect the Car Shops?" I confess that I would find it hard to answer this question.

May I not, as President Wilson would have said, suggest that as individual officers you may have been reluctant to suggest expenditures in this direction, knowing as you do that every railroad company, including your own, has many places in which money might be spent to advantage? To put it in another way, perhaps the car department has been too modest and has not shouted loud enough for help?

There are several old proverbs floating around. One of these is, "A good workman doesn't complain of his tools." This probably originated in the mind of some owner to forestall a request for an expenditure, and perhaps it has prevented intelligent suggestions.

My view is that manufacturers are anxious to build tools to suit the railroads and that railroads should not depend on the manufacturers for all the ideas.

I contend that the master car builders should find out what kind of a tool or machine or device or gadget is needed to turn out the best kind of work for the car department and then insist upon that tool or machine being built. If it is the best for that purpose there will be plenty of demand for it.

I know that you have the knowledge, I know that you have the skill, and that you appreciate the needs of the present situation, and I, therefore, with confidence, leave to the members of this organization the task of removing all the "stumbling blocks" within your control from the path of the traffic department.

Improving Draft Efficiency

(*Continued from page 502*)

duction, it remains simply to adjust the area to give the required back pressure; therefore, draft for combustion requirements in road service.

It may be of interest to know that as a result of the standing tests with this U.S.R.A. 2-8-2-B, not only was the relation of the front-end arrangement determined, but the nozzle area as well. The engine was placed in road service with the nozzle tried in tests 35 to 39. All attempts appreciably to change the nozzle area in road operation resulted in less satisfactory results and the engine has continued in service since March, 1929, with that nozzle.

Design of the Annular-Ported Nozzle

Having developed the benefits and value of the annular-ported nozzle, the method for most readily and conveniently testing, adjusting and measuring the value of it, the next question is how can we determine what is needed and adapt it to a locomotive.

The following rules and method have been developed by the author and used as a basis for the installations previously described. It, therefore, has stood the test of service, and when used in conjunction with the standing test for final study will result in readily adjusting the annular-ported nozzle to any locomotive.

The nozzle area is a function of open tube-sheet area and the perimeter of tubes and flues as the limiting and unchangeable factor in draft requirements. The length of the tubes should also be considered. Good practice with the annular-ported nozzle should give a ratio of open nozzle area to free tube-sheet area of 1 to 33. The longer the flues the smaller this relation. This gives the maximum and tests will adjust size to actual requirements.

The outside diameter of the nozzle should be such that the required area is obtained with as little as possible of the outer periphery taken by annular-port openings. For good vacuum pockets in the jet the openings should take up not more than 30 to 40 per cent of the outer circle circumference. In general, a nozzle 10 in. in outside diameter is suitable for engines with 24-in. or smaller cylinders, a 12-in. nozzle for engines with 25-in. to 27-in. cylinders, and a 14-in. nozzle for engines with 28-in. and larger cylinders.

The center core of the nozzle should be 2 in. or more in diameter, as this portion of the jet is of no value in draft production. The use of a plate shaped with a feather edge to the jet permits of adjusting actual area to coal and engine requirements.

The nozzle should be placed below the horizontal center line of the smokebox and as low as possible. Box in around the nozzle with netting sizes, if necessary, to secure a low stand and maintain table-plate clearance. The table plate should be located so as to give at least 100 per cent of the free tube-sheet area under it.

The diaphragm in front of the table plate should be located so as to give an area at least equal to 70 per cent of the free tube-sheet area. It should be raised as much higher as possible consistent with self cleaning. Good draft distribution and self cleaning have been obtained with the diaphragm raised to give better than 85 per cent of free tube-sheet area under it.

The jet is assumed to expand at an angle equal to twice the angle, the tangent of which is 0.1; *i.e.*, twice 11 deg. 30 min. equivalent to a taper of 1 in 10 on each side. Stack dimensions are determined by laying off the angle of jet expansion from the outer edge of the nozzle, and then determining the location and diameter of the choke. Stack length should be as great as possible, being limited by clearance requirements and the opening between the bottom of the stack extension and the nozzle. This opening should be from 12 in. to 16 in., or 18 in., with a well-radiused bell on the stack extension.

The stack choke should be located well down the stack and of such diameter as to cause the jet to fill the stack at that point. Stack extension should be straight below the choke to the bell radius. Above the choke the stack should be tapered at a total taper of 2 in. in 12 in.

The choke diameter will be determined by nozzle diameter, location and smokebox dimensions, but, in general, use a stack with an 18-in. choke on engines with 24-in. or smaller cylinders, a 20-in. choke on engines with 25-in. to 27-in. cylinders, and a 22-in. choke on engines with 28-in. and larger cylinders.

The exhaust pot should be of ample size at the top to take care of the large outside diameter of the nozzle. It should be so proportioned that there is a restricting or tapering effect in the approach to the nozzle. Where necessary to offset the nozzle and stack for clearances, the exhaust pot should be well bellied out, as in Fig. 4, and then tapered down in order to insure filling the front of the nozzle.

Greater Comfort for the Railroad Passenger

Baltimore & Ohio equips dining car with Carrier system of air conditioning

Interior of the dining car "Martha Washington"

CONSIDERABLE interest was shown in the Baltimore & Ohio dining car "Martha Washington" which was exhibited during the recent conventions of the A. R. A. at Atlantic City, N. J. This car, which is now in regular service as a part of the "Columbian" train between Washington, D. C. and New York, is equipped with the Carrier system of air conditioning. The installation was made by the Baltimore & Ohio in conjunction with the Carrier Engineering Corporation, Newark, N. J. The equipment as now installed on the car is the result of testing and design work during the past year.

In July, 1929, a Baltimore & Ohio coach was equipped for complete air conditioning. The equipment was applied about the first of July and the tests made during hot summer weather indicated that comfortable conditions could be maintained within cars, whether fully or partially occupied by passengers, under the worst conditions of temperature and humidity which are likely to prevail.

Following these successful experiments made in 1929 with the coach, the Baltimore & Ohio decided to equip one of its Colonial dining cars with air conditioning equipment of a similar nature, but differing in certain respects in order to reduce weight and space requirements. Specially designed apparatus was installed on the dining car "Martha Washington." On April 14, 1930, a test run was made in a regular Baltimore & Ohio train from Baltimore, Md., to Cumberland, Md. The full winter heating capacity of the car was turned on, this heat was intensified by heat from the kitchen and warm outdoor weather. When the air conditioning system was set in operation to counteract these effects, the temperature was reduced from 93 deg. to 70 deg. F. in 20 minutes. It was also shown that the temperature could be made considerably lower than this, if desired.

General Description

The air conditioning equipment is designed to free the air in the dining compartment of the car from dust, soot, cinders and other foreign matter and to control the temperature and humidity within certain limits.

Mechanical air filters of commercial type filled with steel wool and enclosed in suitable sheet-steel housings are applied on each side of the car, as shown at *A* in the diagram, at the roof line at the pantry end. Fresh air required in the car is drawn through these filters where cinders, dust and other foreign matter are arrested. The air then passes over cooling coils *B* where its temperature is reduced as desired and where excess humidity is condensed from the air. Thence it is handled by motor driven fans *C* for distribution through insulated ducts *D* on the roof of the car and from which point it is delivered to the interior of the car through the louvered openings in the half deck. In order to prevent drafts, adjustable perforated openings are provided above the louvers in the half deck which are set so as to give an equal distribution of air throughout the car.

Interior view showing the louvered openings in the half-decks through which the conditioned air is delivered

As the temperature in the dining compartment of the car reaches a predetermined point, say 10 or 15 deg. below the outside temperature, the recirculated air which is normally flowing through air recirculating intake *E* and thence over the cooling coils *B*, is closed by the compressed air temperature regulator *F* thus preventing further cooling of the recirculated air. Through a mechanical interlock, when the temperature regulator *F* closes the louvers or moving vanes of the air recirculating intake at *E* the louvers or moving vanes *E'* are opened, thus permitting the recirculation of air within the car without passing over cooling coils *B*. As the temperature of the air within the car tends to rise above a predetermined point, temperature regulator *F* opens louver *E* and closes *E'* and thus provides for cooling the air again. This automatic temperature regulation can be set as required and will function on a difference of three to five deg. F.

The Refrigeration System

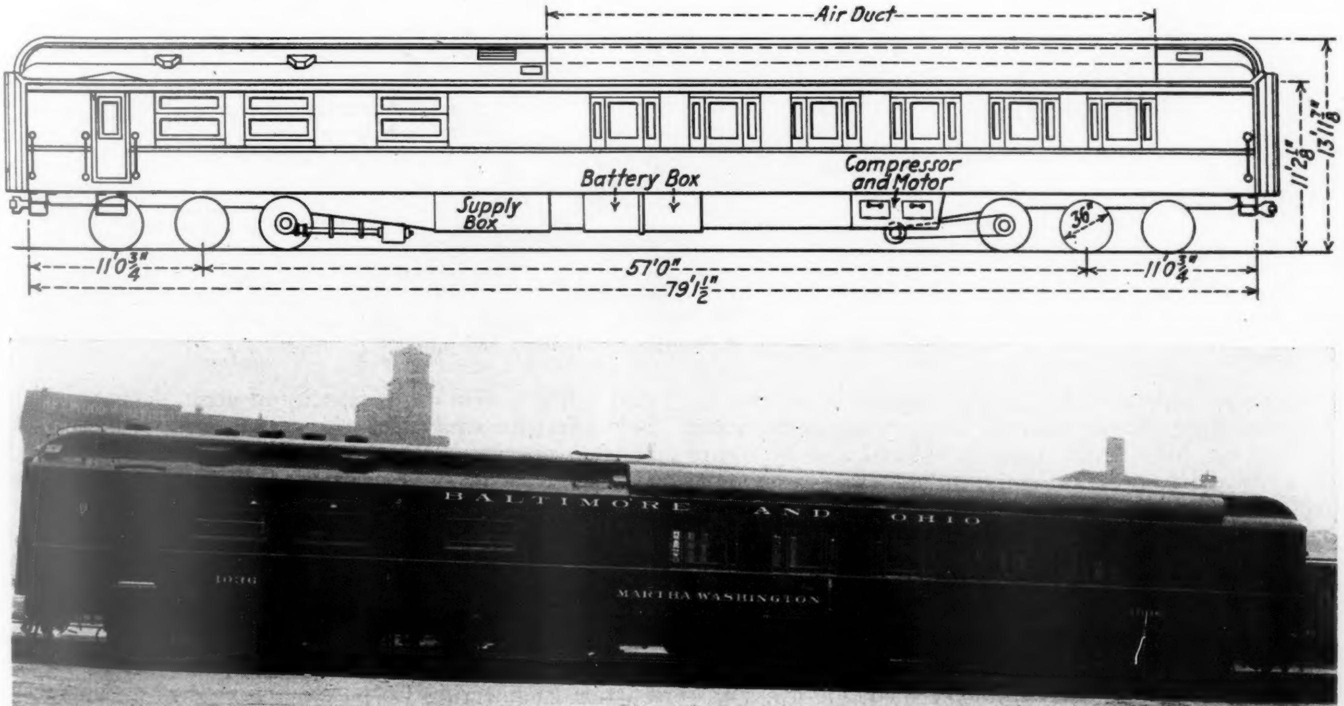
Refrigeration is accomplished by means of a 7½-h.p. motor-driven compressor mounted beneath the car floor. After compression, the hot refrigerant is delivered to the condenser *M*. Within this tank or condenser are small pipe coils through which water is circulating. The refrigerant gas is condensed to a liquid and is then passed through an expansion valve *P*, after which it is delivered to the evaporator *I*. Within the evaporator or tank *I* are pipe coils through which water is circulated. After the refrigerant passes through evaporator *I* and the water within the pipe coils is cooled, the refrigerant is returned through the back pressure valve *R* to the suction side of the compressor *N* where it is available for re-use.

The hot compressed refrigerant at high pressure is delivered to the condenser *M*. By means of water circulated within the coils of this condenser *M* gas is condensed to a liquid. This imparts heat to the water. By means of the motor driven pump *L* this water is circulated, as indicated by arrows, to the cooling tower

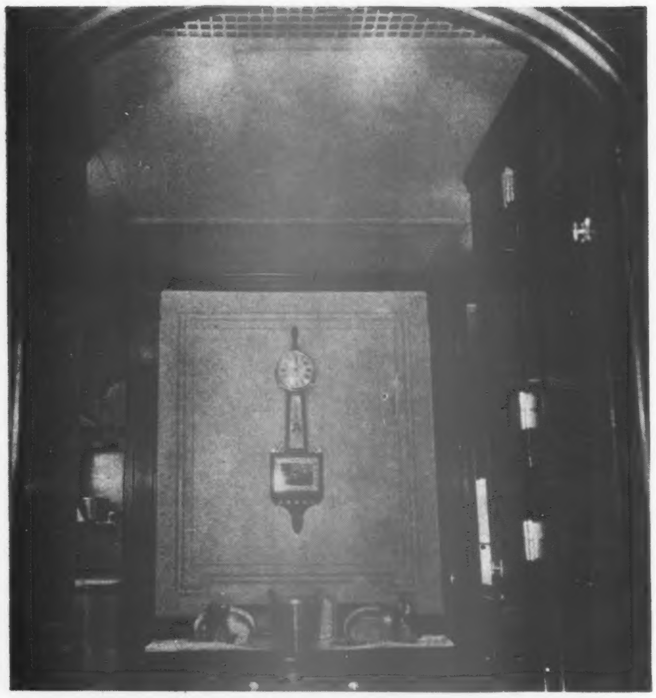
Interior of coach showing the trial installation

K, which is located at end of car opposite the kitchen.

Here the water is picked up and sprayed by a motor-driven pump and outside air is drawn into this water spray by means of a fan mounted on the same vertical shaft with the motor and pump. Thus the warm water from the condenser is cooled to approximately the wet bulb temperature of the outside air. During this process more or less of the condenser water is lost by evaporation. To make up for this loss the water supply tank *J*, located overhead in the car, supplies make-up water through the piping connection and automatic float control valve in the cooling tower *K*. At intervals,



Side elevations of the "Martha Washington" showing the location of the equipment



Recirculating intakes are located in the ceiling at one end of the car

for instance division points, the supply of water is replenished. A maximum loss of 10 to 12 gal. per hour may be experienced under extreme conditions of operation. Thus it will be seen that the condenser water is made available for re-use and the only make-up water required is that needed to replace evaporation.

The water used for cooling the air is chilled in the evaporator tank *I*. Due to the expansion of the refrigerant through this tank, the temperature of the water in the pipe coils of the tank is reduced and by means of a motor-driven pump *H*, the chilled water is delivered from the evaporator *I* to the cooling coils *B* and thence back to the pump and the evaporator as indicated by the arrows. There, of course, is no loss of water in this operation but due to the condensation brought about by the cooling of the air as it passes over the cold water pipe coils, more or less water is produced which is disposed of through a waste pipe. It is by this means that moisture is removed from the incoming air.

Through thermo control *O* provision is made to prevent the temperature of the evaporator from going below a certain pre-determined point usually around 38 deg. F. and thus freezing of the cooling coils and evaporator is avoided. This thermo control functions automatically through back pressure valve *R* so as to close off the return of the refrigerant to the compressor. As the motor-driven compressor continues to rotate, the local circulation between the discharge and suction of the compressor continues through the by-pass valve as indicated on the compressor *N*. If for any reason the pressure on the discharge side of the compressor should rise beyond a pre-determined point, a safety switch of the diaphragm and electric type is provided on the compressor so that the operation of the motor will be discontinued by the opening of a relay in the electric control circuit.

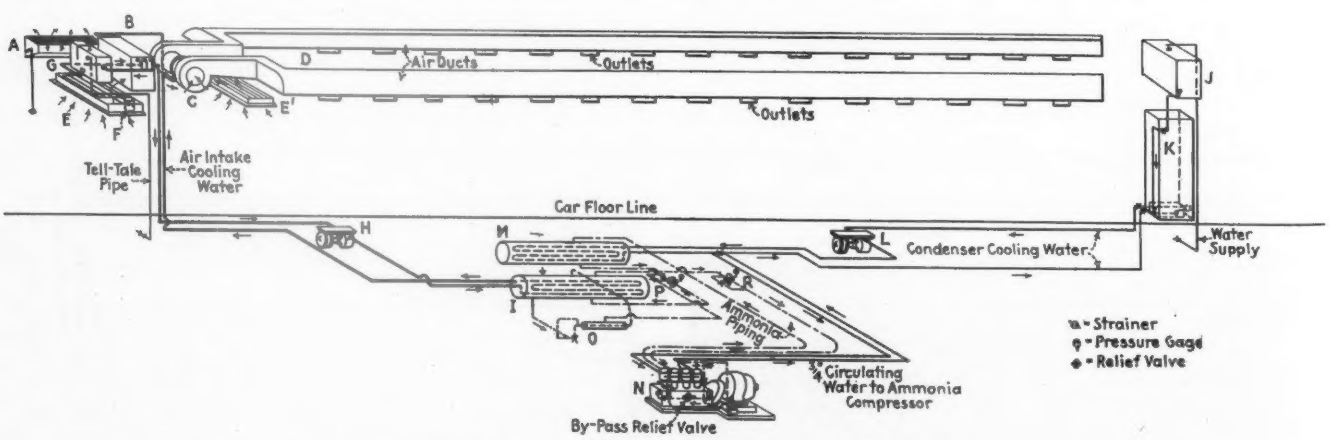
Power Supply

Electric power for the operation of the air conditioning plant and for supplying the lights in the car is provided by a gear-driven 10-kw. 110-volt direct current generator and a 4-kw. 40-volt belt-driven generator. A storage battery used in connection with the 40-volt generator has a capacity of 600 amp. hr. This will be replaced by another having a capacity of 864 amp. hr. and the 4-kw. belt-driven generator will be replaced by a 5-kw. gear-driven unit. Provision is also made for receiving power from a wayside connection when the car is in the yards or is standing for extended periods.

The 110-volt power is used to operate three motors, i.e., the 7½ hp. compressor motor, the 1 hp. motor on the cooling tower and the ¾ hp. motor driving the condenser pump. The 40-volt generator supplies power for lights, fans, the ¾ hp. cold water circulating pump and the ½ hp. motor driving the two fans which circulate the conditioned air.

The cold water pump can be started and stopped independently and the speed of the fan motors can be regulated manually to meet variable conditions. The cold water system has a capacity of about 40 gal., which is in effect the equivalent of a certain amount of storage battery capacity. When the car is standing or running at a speed below the cut-in speed of the generators and the compressor is not working, the cold water and air circulating pumps operate from the storage battery and continue to condition the air until the compressor again goes into operation.

The air conditioning equipment was applied to this car at the Mt. Clare shops of the Baltimore & Ohio and all work done by the Baltimore & Ohio forces. The Carrier Engineering Corporation furnished an engineer to supervise the installation of the equipment on the car. The car has been in regular commercial service since April 23, 1930.



Schematic diagram of the apparatus, ducts and piping

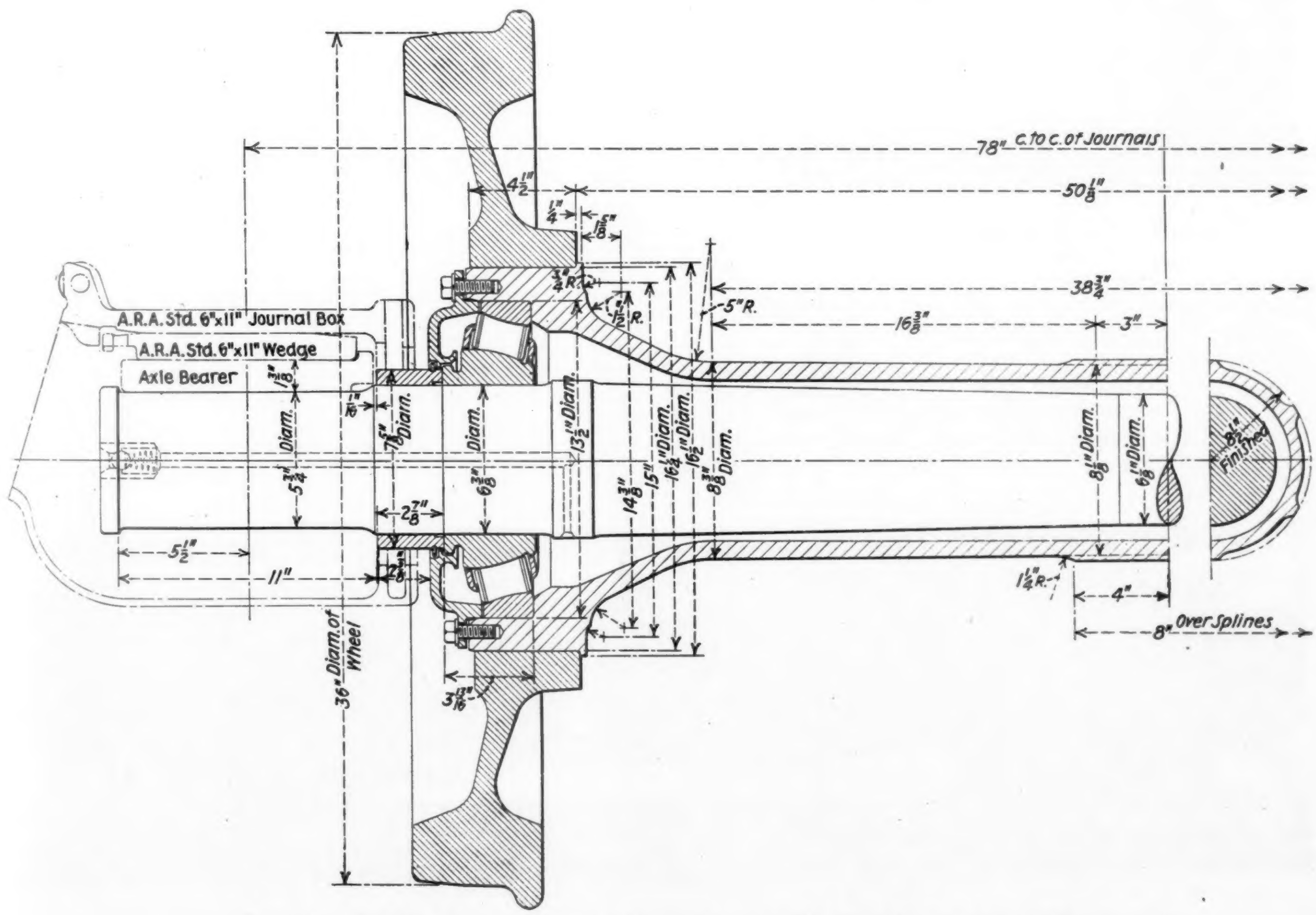
Baggage-Mail Cars Equipped with Roller Bearings

A.S.F. roller-bearing units with Shafer bearings used on fifteen New Haven Cars

THE New York, New Haven & Hartford has had fifteen combination baggage and mail cars, equipped with American Steel Foundries' roller-bearing units having Shafer self-alining roller bearings, in passenger-train service for nearly six months. These cars, which were built by the Bethlehem Steel Company, are reported as operating satisfactorily since the time of their delivery to the railroad.

Each car is carried on two four-wheel trucks having a wheel base of 8 ft. The wheels are 36 in. in diameter and have 6-in. by 11-in. journals. The distance between truck centers is 42 ft. 10 in. The American Steel Foundries' roller bearing unit with the Shafer self-alining roller bearings used on these cars takes the A.R.A. standard 6-in. by 11-in. journal box and wedge, which is applied in the usual manner. An axle bearer of cast iron, however, is substituted for the standard A.R.A. brass journal bearing, as the axle does not rotate.

The bearings are lubricated through a fitting in the end of the axle. The oil passages through which the lubricant passes to the cavity in the unit housing around the bearings are shown by the dotted lines through the end of the axle. Ordinary car oil is used for lubricating these bearings. An initial charge of about two pints of oil was made at the time the cars were placed in service. It is estimated that this charge of oil will be sufficient for a period of at least six months or approximately 50,000 car-miles. About one-half the initial charge is added each time the bearings are given lubrication attention.

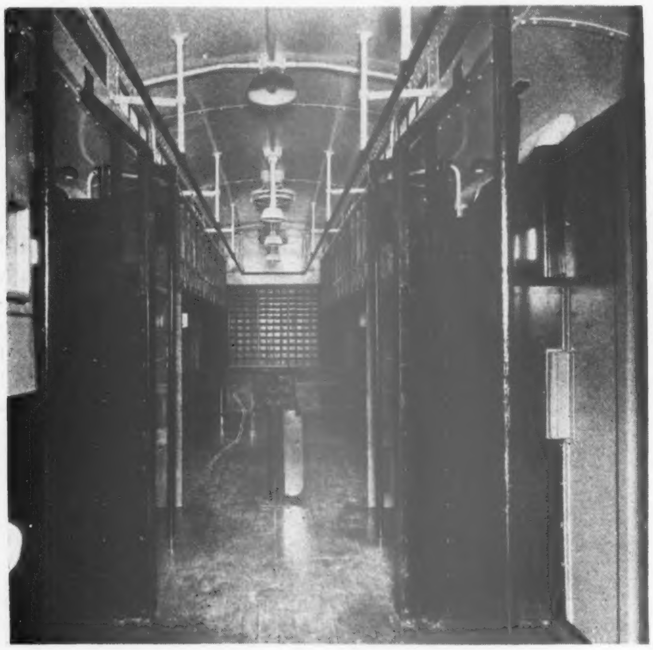


American Steel Foundries' roller-bearing unit with Shafer self-alining bearings

The cars have a length over the end sheets of 60 ft.

11⅝ in. and a width over the side sheets of 9 ft. 10⅝ in. The length over the buffers is 64 ft. 4⅛ in. Ten of the cars have 30-ft. mail compartments and five have 15-ft. compartments for handling mail. All fifteen cars are constructed with fish-belly underframes and have the clerestory type of superstructure. The interiors of the mail compartments are arranged and equipped according to the latest specifications of the Post Office Department. The baggage compartments are finished according to New Haven standard practice for this type of equipment.

Each car has cast-steel combined double body bolsters

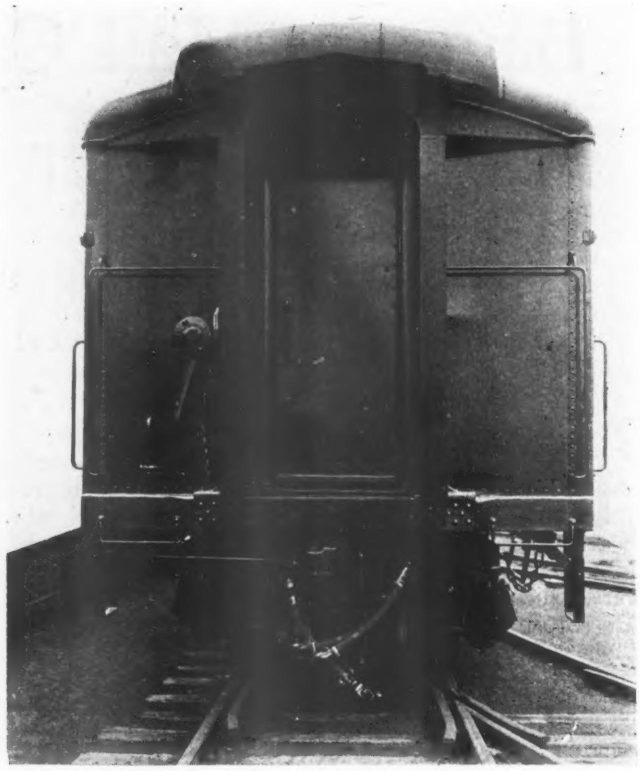


Interior of 60-ft. baggage-mail car with 30-ft. mail compartment

and platforms, as well as cast-steel end frames. These castings are of Commonwealth manufacture.

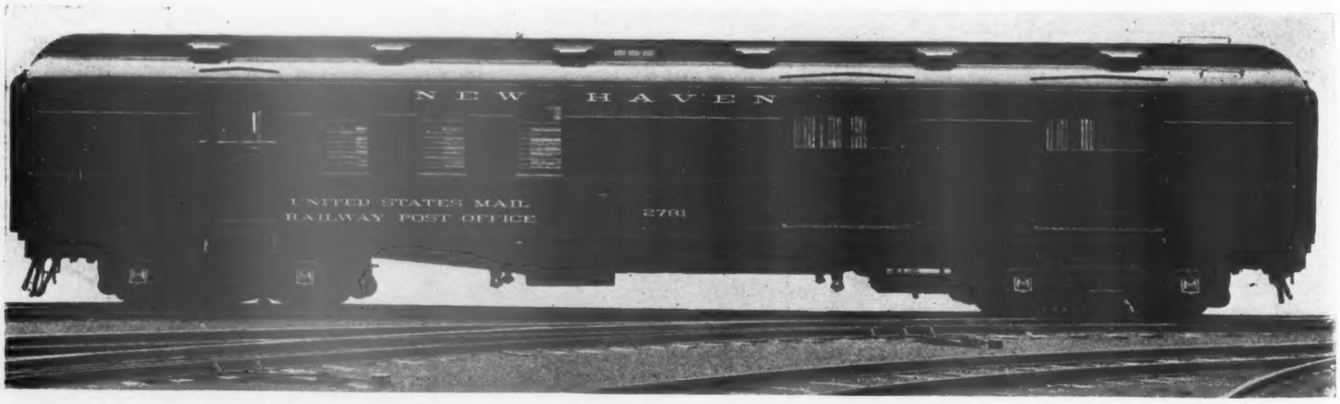
The trucks are of the Commonwealth cast-steel frame straight-equalizer type. Draft and buffing gears are of the Waugh type, the couplers and yokes being of cast-steel quadruple-shear design. The cars are equipped with Westinghouse UC type air brakes, and the trucks have the American Steel Foundries' simplex clasp brakes.

All the cars are equipped with Vapor steam heat with thermostatic control. Coal heaters are provided



End view of the 60-ft. baggage-mail cars with 30-ft. mail compartment

for the five cars having 15-ft. mail compartments, as auxiliary heating equipment. These heaters are located in a corner of the mail compartment at the end of the car. In the opposite corner across the car is a lavatory with a hopper, folding wash basin and mirror. The cars are finished with Duco, inside and out.



Sixty-foot combination baggage and mail car built for the New York, New Haven & Hartford by the Bethlehem Steel Company

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THE YEAR 1264, A. D., appears in the latest item of railroad news. This is the year in which Merton College, Oxford, England, came into the ownership of an oak tree which stood near the Manor House at Cuxham (and so far as appears, has stood there for centuries) and which tree has now been used to provide paneling for a new dining car which has just been put in use on the International Limited of the Canadian National, running between Montreal and Chicago. This train is the fastest long-distance train in the world. This single tree, says our informant, was the largest oak in England and one of the oldest, and it has provided all of the paneling for the dining car referred to. Passengers entering this car will also see various other kinds of rare woods.

EDITORIALS

"Top Sergeant" Still Alive and Kicking

When a reader in Birmingham, Ala., asked a few months ago for information about "Bill Brown" and "Top Sergeant" we were able to reach the former, as recorded in the *Railway Mechanical Engineer* of June, page 340. We had little hope, however, of being able to get in touch with "Top Sergeant." Imagine our surprise when we received the letter from him which is recorded on The Readers' Page of this issue. Judging from their letters these two men are as far apart now as they were five years ago. The letters speak so clearly for themselves that comment on our part would be quite superfluous.

Club Scholarships

Last month the St. Louis Railway Club chose a son of one of its members to be the beneficiary of a scholarship which the club sponsors at Washington University, St. Louis. Since the inception of the plan seven sons of members have been awarded the four-year scholarship and the two hundred and fifty dollar annuity which it carries.

The broad and comprehensive policy of any organization of this kind can have no finer expression than the endowment of such a scholarship which carries with it educational advantages that otherwise might never have been enjoyed by the youth to whom it had been granted. Few organizations, such as this club, have adopted a plan of this kind for furthering the education of its members and many would question the advisability of doing so even if they gave the matter any consideration at all.

With the St. Louis Railway Club, the granting of the scholarship is not an experiment; the first recipient of it was graduated from Washington University in 1902. The advisability of continuing the scholarship is strikingly demonstrated by the reports of the high standing in the community of the seven young men already graduated under the plan and who have entered the business world. All of them are fully appreciative of the possibilities that were furnished them through the club's beneficence and are a credit to the organization to which they owe their education.

Better Locomotive Inspection

Two months have elapsed since the beginning of the present fiscal year for the Bureau of Locomotive Inspection. There are still ten months during which each railroad mechanical department can put forth *special* efforts to reduce the number of defective locomotives. There is a real need for making special efforts this fiscal year. If steps have not already been taken towards reducing the number of defects found on locomotives, now is the time to do so. During the fiscal year ending in 1929, only 21 per cent of the locomotives inspected by federal inspectors were found defective. This was the lowest figure in the history of the Bureau of Locomotive Inspection and was a considerable reduction from the number of defective locomotives in 1923, when 65 per cent were found defective. The fiscal year ending 1929 also had the lowest number of accidents and casualties caused by the failure of locomotive parts, when there were 356 accidents which resulted in 19 deaths and 390 injuries.

The report of the Bureau of Locomotive Inspection for the fiscal year ending June 30, 1930, will not appear until the latter part of this year. However, the fact that the record for the fiscal year ending 1929 was the best in the history of the bureau, will be one reason why railroad mechanical department officers will look forward to the publication of the next report with considerable interest.

Undoubtedly there is an "irreducible minimum" as to the number of defective locomotives below which it is practically impossible to go. Still there is no reason to believe that 21 per cent of the locomotives inspected is the lowest figure that can be achieved. One road has recognized the situation and has offered a prize of $25 to the engine terminal which has 100-per-cent federal inspection during the remaining six months of this year. This road has already made a considerable reduction during the past fiscal year in the number of locomotives on which I.C.C. defects were found. Nevertheless, the management has decided to go further than usual and take additional steps to improve its record.

An Idea Regarding Refrigerator-Car Design

Many thoughts of the greatest importance and the most timely interest especially to railway car men are contained in an address by T. C. Powell, president of the Chicago & Eastern Illinois, before the Car Department Officers' Association (until recently the Master Car Builders' and Supervisors' Association) at the Book-Cadillac Hotel, Detroit, Mich., August 26 to 28, as reported elsewhere in this issue. Mr. Powell discussed the design and use of refrigerator cars, commenting on insulation and suggesting an idea which may be new to some designers of railroad equipment in the following words: "If there could be established a definite relation between the inside dimensions and the cubical capacity of a standard box car, on the one hand, and the inside dimensions and the cubical capacity of a standard refrigerator car, on the other hand, there could also be established a corresponding relationship as to the minimum weights. * * * * * Large movements of such perishable traffic to the great centers result in a corresponding movement of empty refrigerator cars in the reverse direction. A comparatively small increase in the number of refrigerator cars in the reverse direction would operate to reduce the empty movement of the standard box

car as at present." Many roads are now loading certain commodities in refrigerator cars in a successful effort to reduce empty box car mileage as well as empty "refer" mileage and no doubt this practice could be more generally followed if, as suggested by Mr. Powell, a definite relationship between the dimensions of a standard box car and a standard refrigerator car were established.

The Twelve-Hour Shift

TWELVE-HOUR shifts for enginehouse foremen are not an uncommon occurrence and on many railroads they are standard practice. Much has been said concerning the advisability of having the foremen on the job half the day. Those who advocate this practice claim that the foreman thus employed is on active duty during the overlapping of the regular eight-hour shifts and is in better position to facilitate the movement of power than if he came on duty with the men and had to pick up his duties where the relieved foreman left off. To institute a foreman for each shift would mean the creation of an extra high-salaried position, which in itself presents possibly the greatest objection to granting the foreman the same working hours as those enjoyed by the remaining roundhouse forces.

The foreman who is required to work twelve hours has little time to attend to anything else but his job. There are other factors in his life besides his roundhouse duties which requires his attention but which are often sacrificed for the want of time to attend to them properly. He must forego social activities which he rightfully should be engaged in for the benefit of his family, but in many instances this is done without reluctance. On the other hand, there are many occasions on which he has probably wished for a few additional hours with his family.

Twelve hours, day after day with the usual two days a month off, is not a very happy prospect to look forward to for years on end. For a few it is a step in the ladder toward better things but for the many it is an endless grind. The foreman may love the work—the fascination of it is inexplicable—but nevertheless in the end it means nothing to him but work, eat and sleep. He carries on, however, because the job pays more per month than that of the mechanic and he is able better to provide for those who depend upon him but see so little of him.

Is it good reasoning and policy on the part of the railroad to have a foreman on duty twelve hours? Can he be rightfully expected to do his utmost and to complete his work with the best of his ability if he has to remain at his task for such a period? He is not required to participate in repair work, but the continual walking from one end of the roundhouse to the other, the climbing into engine cabs to check inspection cards, the journeys to the ash and inspection pits and countless trips to every corner of his domain are more exacting on him than the repair work is on the mechanic. Yet he works four hours a day longer than the mechanic and is expected to perform his duties day after day without the least complaint not to mention the mistakes and errors he must avoid making. He becomes hardened to it and the repairing, turning and dispatching of engines soon is second nature to him. Regardless of the ease with which he ultimately learns to perform his task he must always be on the job for twelve long hours of each day.

The roundhouse foreman is probably the last of the old twelve-hour guard. The twelve-hour day is but a memory for other railroad employees and yet today, in what we are proud to call our modern world, the roundhouse foreman spends practically all of his time at work, foregoing the pleasures of life that are rightfully his and his family's. How long will it be possible for the railroads to secure men with the ability required to perform the exacting duties of the enginehouse foreman when similar positions in other industries and even in other departments of the railroad provide working conditions which permit those who occupy them to enjoy broader and more complete life?

Does It Pay To Reclaim?

MUCH has been said and volumes have been written about the subject of reclaiming used locomotives and car materials and parts and most of the discussion has been in favor of reclamation. Most roads have built up a reclamation department on a more or less pretentious scale and have gone into the business of reclamation in earnest. Just recently, however, while discussing this subject with a mechanical-department officer we learned that the enormous savings to a railroad due to the reclamation of parts are not always what they seem to be. On this particular road the mechanical department had initiated an investigation into the cost of reclamation and the disclosures of the accountants were so startling as to result in the issuance of an order from the chief mechanical officer to discontinue the reclamation of parts without specific instructions to do so which would be issued only after a searching cost analysis had been made.

As an example of the fallacy of certain figures it was found that the reclamation department showed a substantial saving in the reclamation of brake beams based on the fact that certain sizes cost new from $5.20 to $5.50 a beam while the cost of a reclaimed beam of the same type was running on an average of about $3.40—labor, plus the cost of new parts applied. Here was an indicated saving of at least $1.80 for each beam applied, leaving out, of course, the question of serviceability. This saving was realized on beams applied to the road's own cars. When the question of the beams applied to foreign cars was considered, the saving turned into a loss since here was a case where the road was applying parts which had cost $3.40 to produce and for which it could only obtain an allowance of $2.50—$4.15 second-hand price less $1.65 scrap credit. The investigation into the cost of reclaiming disclosed many similar cases, particularly in relation to car parts, where the reclamation department was showing a saving in relation to the cost of purchasing new parts but where, in reality, the railroad was losing money. Without doubt, it would be distinctly worthwhile for the mechanical departments on many roads to look into the real cost of reclamation.

An Important Step In Passenger-Car Design

UNUSUAL interest was displayed by railroad men in the Baltimore & Ohio dining car "Martha Washington" when it was exhibited during the coventions of the A.R.A. at Atlantic City last June. This interest was not because such famous people as President and Mrs. Hoover; the Coolidges, and Hardings while they were residents in the White House, Queen Marie of Roumania, Premier MacDonald and a host of other celeb-

rities had been entertained in this car, but because the car was the first to be placed in regular service equipped to cool and cleanse the air and to provide ideal atmospheric conditions in the car so that passengers could ride more comfortably. Undoubtedly this development in passenger car construction is the most important from the standpoint of attracting passenger business since Pullman began the extensive utilization of sleeping cars.

As stated in an article elsewhere in this issue, this system of air conditioning is the result of experimental work which was initiated in July of last year. The first experimental car was a Baltimore & Ohio day coach. Tests which were made with this car during the hot summer weather of 1929 showed that comfortable conditions could be maintained within the car whether fully or partially occupied by passengers under the worst conditions of temperature and humidity which are likely to prevail.

Tests of the "Martha Washington" showed that during the hottest days in summer a temperature of from 10 to 15 deg. F. below that outside could be maintained, and, even more important, excessive humidity during muggy summer weather could be removed. In one of these tests, which was observed by representatives of the Baltimore & Ohio and the Carrier Engineering Corporation, the full winter heating capacity of the car was turned on. This heat was intensified by the heat from the kitchen and the warm weather outside. The air conditioning system was able to counteract the effect of this heat by reducing the temperature inside the car 23 deg. F. in 20 min.

A second car equipped with the same type of air conditioning system was recently placed in service by the Santa Fe. This car, which was built new and named the "Chief," made its initial test runs through desert country. With the car loaded with passengers, it was possible to maintain a temperature of 72 deg. F. or less in the dining room with all of the kitchen stoves in operation and a temperature of 104 deg. outside. Needless to say, the diner was the most popular car on the train.

The system of air conditioning which is installed on the "Martha Washington" and the "Chief" is fundamentally the same as the system which is being extensively used for conditioning the air in theatres, office buildings and factories. Naturally, there were many problems which had to be solved before the system could be successfully operated on a moving "building". Some of these problems, such as the supply of electrical energy, have not as yet been solved to the complete satisfaction of the two railroads or of the manufacturers of the equipment. However, in the light of recent developments, there is good reason to believe that these problems will be solved in the near future.

Air conditioning for passenger cars is a new proposition in railroad operation. Its advantages are too obvious to railroad men to warrant a discussion of the subject. Cinders and dust have been important factors in causing prospective railroad patrons to use other forms of transportation. There is good reason to believe that the provision of comfortable atmospheric conditions in passenger cars will have a greater influence toward retaining present passenger business, and perhaps regaining some of that which has been lost, than any other development in passenger-car design. Maintenance of air-conditioning equipment will necessarily fall to the mechanical department. Further developments in air conditioning, especially in the types of equipment, will be followed with considerable interest by those who will have supervision of its maintenance. The traveling public will find travel by rail in the near future considerably more comfortable and even more luxurious than at present.

NEW BOOKS

Locomotive Engineers' Pocket Book. *Published by the Locomotive Publishing Company, Ltd., 3, Amen Corner, Paternoster Row, London, E. C. 4.*

The 1930 edition of the Locomotive Engineers' Pocket Book contains 25 chapters, the first chapter being devoted to a discussion of the general conditions entering into the design and performance of a locomotive. The other chapters discuss resistances, locomotive tractive force, boiler power, engine power, wheel arrangements, locomotive superheating, the construction of a locomotive type boiler, recorded locomotive performances, the fastest runs on British railways during 1929, etc.

The Balancing of Engines. *By W. E. Dalby, F.R.S. Published by Longmans, Green & Co., New York, 321 pages, 6 in. by 9 in., illustrated. Price $8.40.*

This is the fourth edition of a book published in 1902 for the purpose of showing a new method of solving balancing problems and of finding balance weights. The novelty of the method was the introduction of the idea of a reference plane and schedule which would enable a competent draftsman to find the balance weights for a complex system of masses about an engine crank shaft with a drawing board and slide rule. The main object of the fourth edition remains unchanged, but new applications of the principle are described. The book now contains the following chapters: The Addition and Substraction of Vector Quantities; The Balancing of Revolving Masses; The Balancing of Reciprocating Masses—Long Connecting Rods; The Balancing of Locomotives; Secondary Balancing; Estimation of the Primary and Secondary Unbalanced Forces and Couples; The Vibration of Supports; The Vibration of Railway Bridges; the Motion of the Connecting Rod, and The Balancing of Internal Combustion Engines. Of particular interest to railway engineers are Chapters IV, VII and VIII. Chapter IV deals comprehensively with the problems of balancing various types of locomotives, including both inside and outside connected, combinations of the two, and three-cylinder locomotives. Chapter VII, entitled "The Vibration of Supports," deals with the periodicity of masses under the action of periodic forces, damping, and simultaneous action of several forces or couples in various periods, etc. Chapter VIII, which deals with the vibration of railway bridges, is based on the investigation of a Bridge Stress Committee appointed by the British Department of Scientific and Industrial Research which was organized "to conduct researches with references to the stresses in railway bridges, especially as regards the effects of moving loads." The field work of the committee continued from 1923 to 1927 and its report was finished late in 1928. The chapter deals with the work of this committee, giving an account of their experiments, conclusions and recommendations for the impact allowances to be made in railway bridge design. In the light of the work of this committee, the chapter on locomotive balancing has largely been rewritten in this edition.

Fifty Years Ago.—The New York Central & Hudson River [now the New York Central] has adopted the automatic air brake for installation on its rolling stock, and has given orders for the equipment of its passenger cars. This road is almost the last of the large railroads of the country to adopt an air or vacuum brake.—Railroad Gazette, July 23, 1880.

THE READER'S PAGE

Word From "Top Sergeant"

To the Editor:

One of your editors has succeeded in finding me and has called my attention to the question as to my whereabouts in the June number of your paper.

Well, it had been read before he reached me. Away back in August, 1925, when I happened to write the letter signed Top Sergeant, which was hardly expected you would publish, I was too busy to read mechanical papers and said so, but as a rule I did occasionally read the *Railway Mechanical Engineer,* not perhaps so much for what I got out of it, but because our superintendent of motive power sometimes discussed at his foremen's meetings subjects mentioned in it.

Right here, let me say that, for obvious reasons, I do not want to have disclosed my name or the railway I am located with, but in answer to your representative's request and on his pledge that my identity would not be revealed, will say that five more years of dealing with workmen has not changed my views. Railway employees are out for all they can get.

I wonder if Bill Brown ever goes into his shop just at starting time and at quitting time, and if so, how many he finds at work within the first minute, or say a few minutes before quitting time does he find perfect quietness in his shop and some very busy washing up, perhaps in oil. Just get a reputation like he is so proud of and see what you would find if you wanted to look for it as outlined above. No, for this and many other easily demonstrable reasons you cannot treat men as Bill Brown imagines.

I do not know where he is located, but venturing a guess would say that it is some little road that possibly is situated where business is always profitable, very probably not coming in competition with large roads at all. That his men never have worked anywhere else, are all married and have their homes in his town. Possibly, under such circumstances he can get away with his coddling policy, but it will not work on a good big system where all sorts of men are to be dealt with.

Yours truly,
Top Sergeant.

Defends the Modern Car Shop

Pittsburgh, Pa.

To the Editor:

After reading C. E. Loyd's letter in which he comments on the article appearing in the June issue on "Modernizing a Car Repair Shop," I was inclined to believe that the editorial on page 338 of the same issue (June) had hit the nail on the head when it stated that "perhaps the step-child had missed opportunities" in dealing with the modernization of Ridge Point car shop. No doubt it did. A proposition as large as that contemplated by Carson must necessarily have the kinks ironed out of it as the project nears completion. On the other hand when we consider that the plan for modernizing the car shop was brought about by an individual, (Carson) who, when he assumed charge was being held responsible for conducting the shop on a more efficient basis than had been expected of his predecessor and was therefore compelled to increase output with a decreased labor force, it is apparent that he gave careful consideration to many plans before recommending one which involved the appropriation later approved by his company.

Carson was an advocate of the progressive system while Mr. Loyd, it seems, is not in favor of this system. When we take into consideration that most of the cars now being built by the large steel car manufacturers are built in shops which are working the straight line or progressive system it would appear that either Mr. Loyd, or the railroad on which he is employed has not kept up with the times.

Mr. Loyd states that 14 car repairers are repairing 1.2 U. S. R. A. 55 ton steel hoppers each day, renewing side and end sheets, slope sheets, cross hoods, center ridges, inside and outside hopper sheets, hopper doors and miscellaneous items, the cars being stripped to the center sills—not on the progressive system either. Figuring this out on the basis of an eight-hour day it is apparent that all of this work is done on an average of 93.3 man-hours per car at an approximate labor cost of $65.00 a car, as compared with an average labor cost of $105.00 a car at most of the present-day car shops throughout the country. Personally I do not believe Mr. Loyd secured his figures from a very reliable source or else he is just trying to be funny. He is apparently a strong booster for sand-blasting as I note he either has two sand blast outfits or sheds or sand-blasts the sills in the fourth space and hauls them back to the first space again, then sand-blasts the car after it has all of the new sheets and material applied.

I might ask Mr. Loyd, who handles the material to the cars? Who loads up the scrap, operates the sand-blast and the crane handling the sills, packs the journal boxes, paints and stencils the cars, cleans and repairs the air brake equipment, heats the rivets and bucks them up? Surely he is not going to infer that these 14 car repairers do this work too. Why not go out and count this auxiliary force and then check up on your labor cost to see if the progressive system would not be advantageous.

If Mr. Loyd is endeavoring to compare the facilities required to operate a shop employing 14 men with one having 200 men or more, he must take many things into consideration. This he failed to do. Then, too, we are told by Mr. Loyd that "the work is done in the open." Certainly he does not wish to convey the idea that he receives increased efficiency by working cars in the open. What happens when it rains or when there is snow and sleet and the weather is around zero? Suppose you do have some car repairers who are willing to work in the open during inclement weather, there are also some who will not. This creates an unbalanced force and causes a loss of efficiency for the reason that one man in a riveting gang who lays off—or one in a fitting-up gang or stripping gang, for that matter—will break up the organization to such an extent that there is a loss of from 15 min. to an hour filling his vacancy from an auxiliary force, provided of course one is maintained. Probably Mr. Loyd has never been afforded the advantage of a covered car shop and, if not, could not conceive the many advantages to be derived, both from the standpoint of increased efficiency and the effect on the morale of his organization.

Again, in his letter Mr. Loyd cites a case where 750 composite 55-ton hoppers were completely rebuilt at the rate of 3.5 cars a day with from 30 to 32 car repairers. Now with a supplementary force of about 12 car repair helpers, three apprentices, one air-brake repairman, one painter and one painter helper and a laborer to clean up, I don't see anything unusual about this performance. However if these 32 car repairers rebuilt 3.5 cars a day, from the sills up, without the aid of the above force, I am sure that Carson would have welcomed the opportunity of visiting this shop before he made his recommendations to his master car builder for the new shop at Ridge Point.

Why all the machinery? Well, if you refer to page 311 of the June issue of the *Railway Mechanical Engineer* it will be noted that in the fabricating shop recommendations were made for one 1,500-ton, four-column flanging press, a rotary shear and a punch and shear capable of shearing angles, Cambria-section side stakes, round and bar iron stock. This makes a total of three machines, not one of which can be dispensed with even in a car shop which purchases all of its material in fabricated form, as it is not unusual to run short of a few items now and then and which must be manufactured locally in order to keep the shop forces working. Then too there are splices and plates which must be fabricated locally and, if the machines are not available to manufacture them, the acetylene torch must be brought into use, which makes a very costly operation.

What railroad executive would not consider increasing his car-shop output 45 cars a week at an expenditure from which could be derived a 17 per cent to 20 per cent return on the investment? Would it not be possible to close down several smaller shops at isolated points due to the increased number of cars which could be rebuilt at a shop where the expenditure was to be made, thereby realizing a greater return on the initial investment for at least one modern car shop?

The writer would enjoy hearing from other car-department men as to whether they feel that Carson really took advantage of the facilities which were available upon his assignment to Ridge Point car shop, or, as the editorial in the June issue suggested "did he miss opportunities for bringing about a happy reconciliation by expecting the misguided parents to make more than half the advances?

H. K. Allen.

The Special Apprentice

Decatur, Ill.

To the Editor:

At various times we have a recurrence of the question; the college man and the railroads. A good per cent of the college men who enter railroad service do so via the mechanical department. The special apprentice of today expects something of the railroad and the railroad of today has a right to expect something of him. If either or both are disappointed, as they seem to be in so many cases today, what is the answer? Who is at fault?

A few years ago a young man went to college to train himself for some definite thing. If he had a natural mechanical bent, he went to college to develop this, or to perfect himself in some line of activity to which he expected to devote his life. Conditions have changed, the average young man of today plans not to go to college to study something, he plans to study something to go to college. But how does he select his study? By the grab bag method as a rule. Then in his first or second years he finds that he is wholly unadapted for his first choice and picks a new one. Naturally, he has no previous experience to help him in his selection, and may again choose unwisely.

A young man born and reared in a railroad family and in a railroad atmosphere should know and will know something of railroad life. He should be able to discriminate between railroading and something else with some sense of judgment. He has an advantage over certain young men with no railroad background who have unfortunately picked the name railroad out of a hat, so to speak. The uninitiated young man has a certain figure in his mind which he expects to attain at a certain age, by entering railroad service, going through the motions and trusting the tide to eventually carry him to the crest. He hopes in a vague way to live in a more or less collegiate and social atmosphere and trusts he will not have to devote himself too diligently to the commonplace details of this prosaic subject. He finds himself faced with the unsavory prospect, after serving a couple of years as a special apprentice, of a position as assistant to a night enginehouse foreman, in some out-of-the-way enginehouse. There is no one at hand to assure him that he will not be buried there.

About this time he hears of some classmate who has temporarily risen to a place of prominence in some fly-by-night concern. Being young and unable to discriminate, he looks at his railroad career with a wry face. His wife probably at this time cannot effervesce over an indefinite stay in Podunkville, surrounded by nothing more uplifting than a village beside the coal dock. The conclusion of this hypothetical case may be finished to suit the individual reader. A failure, why? Lack of intimacy with the details of his chosen work, not adapted temperamentally, physically or socially. What does he do? He either leaves to seek a new field or relapses into a disgruntled subordinate.

The average college man is not a snob. Far from it. But prevalent among them is a hope that their personal friends will be those of an equal educational plane and they become discontented when they find themselves in a walk of life where this can not be.

A certain young man is known to the writer who served his apprenticeship in a railroad shop and then applied for admittance to the agricultural college of one of our large universities. The dean of the department, much to the young man's disappointment at the time, refused to admit him, on the ground that his experience and training would not adopt him to agricultural pursuits. He was advised to continue his mechanical career. He has done so and has since been grateful to the dean for his wise council. The last news of him was to the effect that he was a successful mechanical department supervisor.

A railroad man may well go to college, but not all college men can go railroading.

E. B. Baker.

Fifty Years Ago.—The master car builders and superintendents of nine roads operating east of Chicago and north of the Ohio river met at Buffalo, N. Y., on April 22 and 23, and after examining 17 different styles of cars and discussing their features, agreed upon a standard for each of the following named varieties: Box cars, four and eight wheels; stock cars, single and double deck; gondola cars, four and eight wheels; flat cars.

With the

Car Foremen and Inspectors

Reclaiming Packing on the D. & R. G. W.

By Joseph C. Coyle

REALIZING the need of an entirely different arrangement for reclaiming packing, the Denver & Rio Grande Western is reconstructing its building in which the packing is reclaimed at Burnham, Col. A new top was first run on the concrete floor of the oil house and more windows installed for light. Three large electric globes were installed at advantageous spots near the ceiling, which gave plenty of light for the work, a feature which had been previously lacking. Referring to the floor plan and piping arrangement drawing, a 150-gal. tank was installed underground, near the outside at the southwest corner of the building, for the storage of new oil. A similar tank was placed underground near the southeast corner for the storage of filtered oil. A ¾-in. pipe reaching from within 1½ in. of the bottom of the storage tank for filtered oil runs to the top of a steel vat for saturating reclaimed packing, located inside the building near the southwest corner. A similar pipe leads from the storage tank for new oil to a similar vat used for saturating new packing placed near the northwest corner of the room. A bib cock at each saturating vat controls the flow of oil.

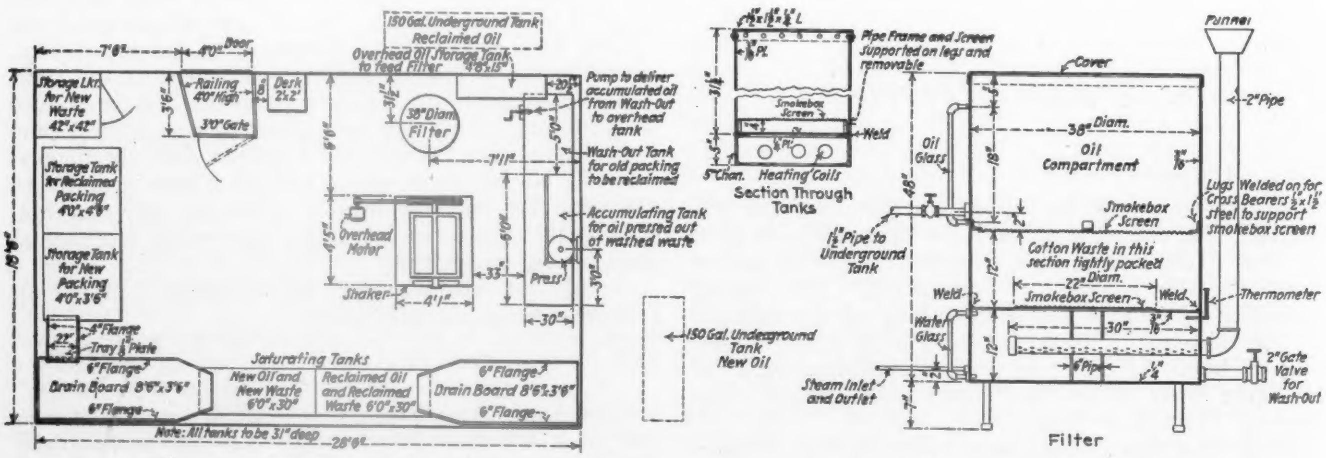
A ½-in. pipe from the main air line runs underground to the top of each storage tank, with cut-off cocks in each line located outside of the building.

The washout tank for old packing, located just inside the southeast corner of the building, is 5 ft. long by 30 in. wide and 31 in. deep. To the outside of this tank is fastened a small centrifugal pump, with a flexible intake pipe perforated near the end, for pumping dirty oil from the tank into an overhead rectangular storage tank which is 4 ft. 8 in. long by 15 in. wide and about 15 in. deep, with an outlet pipe at the end. It holds about 50 gal. and is equipped with a glass level gage. The outlet pipe, with a valve near the end of the tank to control the flow of oil, discharges the contents of the tank into a 2-in. pipe, with a funnel shaped top, leading into the filtering tank. This pipe reaches almost across the filtering tank, about 4 in. off the bottom, supported by a short section of 6 in. pipe. Inside the filter the pipe is perforated on the under side with ½-in. holes spaced 2 in. apart.

Filtering apparatus used at the new D. & R. G. W. oil house located at Burnham, Col.

Construction of the Filter Tank

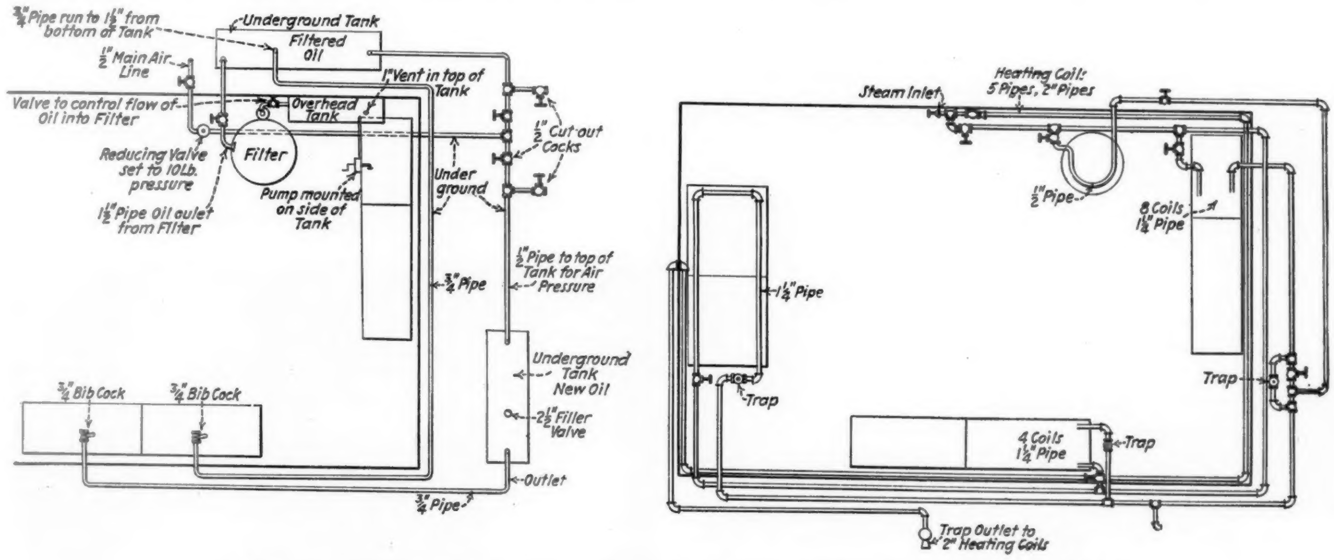
The filter tank is 38 in. in diameter by 48 in. high, set on pipe supports 7 in. off the floor. The bottom of the tank is made of ¼-in. steel and the sides of 3/16-in. steel, with a cover of the same material. Twelve inches from the bottom of the tank a section of smokebox screen, 22 in. in diameter, rests on a 9-in. wide projection of 3/16-in. steel welded to the inner surface of



Left: Floor plan of the D. & R. G. W. waste reclamation plant; Right: Construction of the filter

the tank. The screen is stiffened in the center by two 3/16-in. metal supports resting on the perforated pipe. This section of the tank is kept full of hot water, heated by a coil of ½-in. steam pipe running in and out of the side near the bottom. There is also a glass gage at one side to show the amount of water in the tank.

On top of the smokebox screen 12 in. of waste is tightly packed, on top of which is placed another section of the screen resting on a narrow metal strip around the sides. Just above this screen is a 1½ in. outlet pipe which leads to the underground storage tank for filtered oil. The filtered oil is contained in the upper part of the tank, the amount of which is indicated by a glass level gage. A washout valve is located at the bottom of the tank so that it can be drained and the waste changed every two weeks. In running oil from the overhead storage tank into the filter the valve to the former is merely cracked so as to allow the oil to pass through slowly. As this oil rises from the perforations at the bottom of the filter through the 12-in. of hot water and through the 12 in. of waste, both of these cleansing agents tend to precipitate the impurities. Tests made of the filtered oil have proved that its physical characteristics are practically equal to that of new oil.



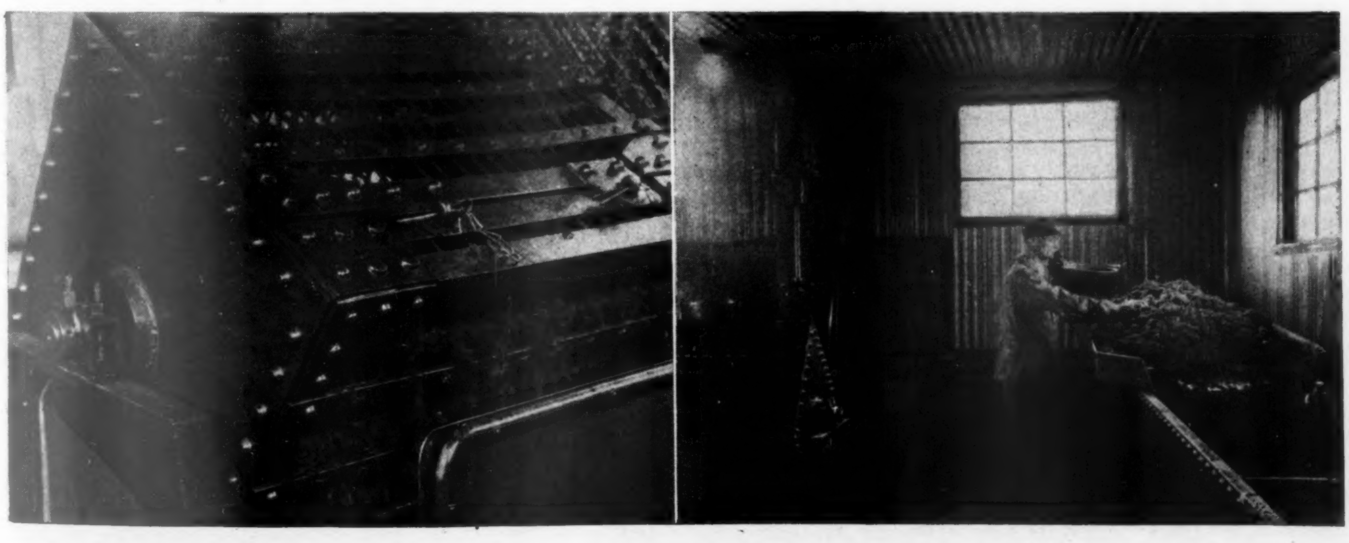
Piping arrangement of the remodeled waste reclamation plant of the D. & R. G. W.

About 700 gal. of used oil are reclaimed monthly with the filter

Adjoining the saturating tank already described is another tank of the same width and depth and 6 ft. long, which is used to accumulate oil pressed from the packing washed in the tank first described. Directly over this second tank is a press made from an old air brake cylinder, with a circular sheet of metal welded to the end of the piston. This enters the top of a double, perforated metal can in which the saturated waste is placed. The air line to the press cylinder is equipped with a pressure gage.

Method of Removing Short Strands of Packing

The waste is removed from the press and placed in a shaker which is located directly in front of it. It is 2 ft. square by 3 ft. long and is made with a frame of ¼-in. steel strips, strongly riveted together. Over each of the four sides, as shown in the illustration, are a number of ½-in. steel rods, reinforced every 4 in. by a flat bar of steel running at right angles to the rods and to which are fastened steel spikes 3 in. long, projecting inward. These rods and bars form a mesh of 1½-in. by 4 in. On one side of the shaker is a door,



Left: Shaker in which the short strands of packing are removed. Right: Shaker, press, draining board and oil vat used for reclaiming old packing

held closed by two cotter keys, through which the machine is loaded and unloaded. This door is made up also of rods and bars strongly riveted. The shaker is supported on two trunnions which fit into boxes mounted on a strong steel frame. The lower part of the frame is enclosed by sheet metal, except on the side next to the packing press where a sheet metal shield supported by a frame of light pipe and of the same height as the rest of the frame stops fragments of waste thrown from the machine. It also leaves an opening at each corner for removing short waste and dirt which is shaken from the machine. In the illustration many tufts of this short packing, formerly a prolific source of hot boxes, may be seen adhering to the bars of the machine. The shaker is run by a belt driven by an overhead motor.

From the shaker the reclaimed waste goes into the saturating tank previously mentioned near the southwest corner of the room. This tank is 30 in. wide by 31 in. deep and 6 ft. long. From this tank the soaked packing is forked onto a draining board 3 ft. 6 in. wide by 8 ft. 6 in. long, located at the south end of the tank. It also is made of sheet steel with smokebox screen netting placed a short distance above its surface and on which the packing is placed to drain. The packing is then ready to go back in the journal boxes.

Adjoining the last-mentioned saturating tank is a similar tank and draining board for new packing used in locomotives and passenger coaches. From this draining board a sloping chute 22 in. wide is used to slide the finished new packing into a storage tank about 3 ft. away. This tank is 4 ft. wide by 3 ft. 6 in. long and is joined at the east end by a similar tank for the storage of reclaimed packing. The packing tanks are made of 3/16-in. plate, re-inforced at the bottom corners by a 5-in. channel iron at each side and at the top by 1½-in. by 1½-in. by ¼-in. angles at each side. Three steam pipes run the length of the tanks at the bottom and over these is a ¼-in. plate, welded to the top of the 5-in. channels. Four inches above this a smokebox screen is supported on a pipe frame resting on the plate.

In the north east corner of the building is a waste storage locker, which is 42 in. square with two doors reaching from the floor to the ceiling. This also is made of 3/16-in. plate and has two compartments, one above the other.

A railing and gate 4 ft. high surrounds the entrance door on the east side of the building and close by is a small desk 24 in. square for the use of the one man in charge of the oil house. The floor, the corrugated iron walls and the tanks, in fact all of the equipment, is kept well painted and strips of linoleum run the length and breadth of the room. A pair of scales is kept nearby for the weighing of packing for shipment. Six lines of steam pipe around the room keep it at the required temperature of 70 deg. at all times.

No new oil or packing is now used in freight service. The used packing reclaimed from passenger coaches and locomotives make up for that which becomes worn out. From 300 to 600 lb. of packing is reclaimed daily by one man, at a wage of 55 cents per hour. During the month of January, 1929, approximately 24,000 lb. of packing was reclaimed and about 6,000 lb. of new packing manufactured. There is no doubt, according to I. G. Burks, general car foreman, that the new system is effecting a big saving in the cost of producing packing aside from the stopping of hot boxes.

During a seven months' period after the new system of handling car journal packing was put into effect, only five hot boxes were reported out of the Denver terminal. As a result, similar oil and reclamation facilities are going to be built when needed on the system.

Cleaning Passenger-Car Trucks and Steps

THE exterior cleaning of passenger cars should include the steps, both inside and outside aprons and the trucks, but is rarely if ever done except in the case of cars operating on featured trains.

On a number of railroads it is difficult to find the

Passenger-car trucks being sprayed with caustic-soda solution

pedestal numbers on trucks or the date indicating when the journal bearings and wedges were last examined due to the fact that this stenciling has been covered with grease and hardened dust, and apparently no attempt is ever made to brighten up the stenciling or the truck itself until it is repainted.

Trucks and steps are just as much a part of the exterior of the car as is the letter board or side plates and should receive cleaning attention whenever the outside of the car is cleaned or wiped down, as the appearance of a passenger car with a polished side and dirty trucks and steps is inexcusable.

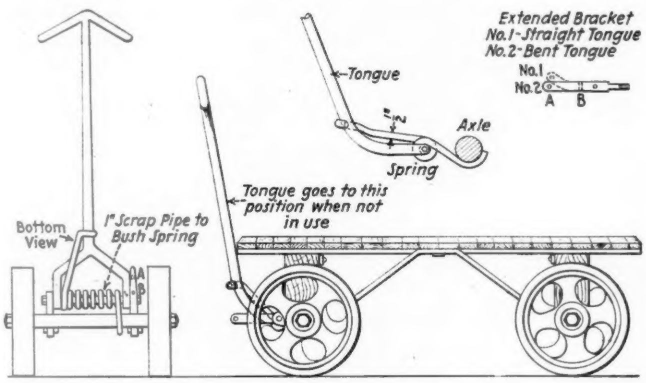
Cleaning of trucks and steps is rather a difficult task when this work is attempted by the hand method. However, a device has been perfected by an eastern railroad and is being used at various terminals which takes care of this work in an efficient manner. A pressure tank 48 in. in diameter and 60 in. long is buried alongside of the lead or ladder track to the coach-cleaning yard. As passenger cars are brought to the yard from the passenger station a solution of caustic soda is sprayed on each truck. This solution loosens the dirt and softens the grease to such an extent that a similar spray of water, located approximately 120 ft. distant, removes it before the solution has had a chance to affect the paint on the trucks and steps. The strength of the caustic soda solution depends upon the condition of the trucks and steps and it may be necessary to use from

15 to 20 lb. of the caustic soda to each 50 gal. of water if no previous attenion has been given them. However, this can be cut down to five or ten pounds to each 50 gal. of water after the heavy dirt has been removed or loosened.

The illustration shows the piping arrangement and the spray in operation, the spray on each side of the car being controlled by the lever shown in the foreground. The caustic soda solution is kept mixed and ready for use in the two barrels so that it can be emptied into the pressure tank when the supply has become exhausted.

Spring for Truck Handles

In the illustration is shown a convenient method of arranging a spring to hold the tongue of the usual four-wheel truck in a raised position, thus eliminating the handle of these trucks as a contributory factor to accidents. The spring is set against the front axle of the truck, bushed by a piece of 1-in. pipe, and set against the under side of the handle as shown. Two types of



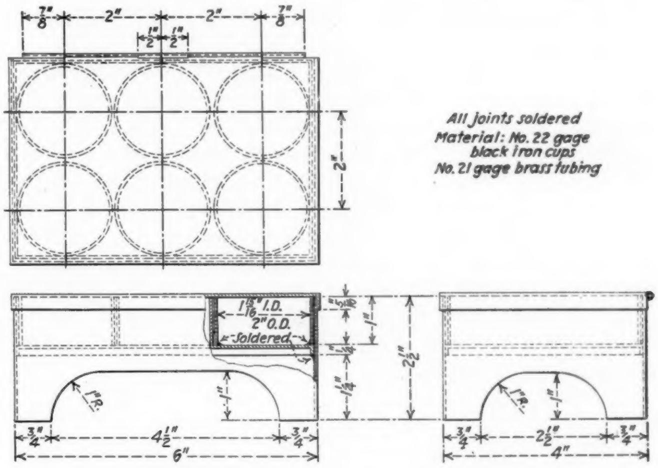
Spring used to hold the truck handle in a raised position when not in use

extension brackets are used with the spring, depending on the type of tongue used. Type 1 is used with the straight tongue and type 2 is used with the bent tongue. To lower the tongue, it is necessary to place a pin or a bolt through the hole *A* in the extension bracket. When the tongue is in its free position, the pin or bolt can be carried in the hole *B*. The spring is shown applied over the top of the tongue so that it may be applied free of the load.

Container for Cleaning Compounds and Greases

Shown in the drawing is a handy container with six receptacles for grinding and lapping compounds. It is made of No. 22 gage iron sheet. The cups are made of No. 21 gage 2-in. brass tubing. They are one inch deep and can be removed from the container when desired. The container is 6 in. long. by 4 in. wide and is 2½ in. high. The cups contain grinding and lapping compounds used in making repairs to triple valves.

Two compound mixtures are used by the air-brake department, for which this container was designed, for grinding check valves. The first mixture contains one half, by measure, No. 120 carborundum and one half Plumbago. The second grinding compound contains No. 80 carborundum and Plumbago in equal parts. Lapping compound contains equal parts, by measure, of No. 600 carborundum and Plumbago. These two ingredients are thoroughly mixed and a small amount of machine oil is added, sufficient to make a thick paste.



Container for compounds and grease used for cleaning triple and distributing valves

The lapping compound is then placed in a cardboard box which absorbs the machine oil. There are some grades of graphite which may be substituted for Plumbago.

Decisions of Arbitration Cases

(The Arbitration Committee of the A.R.A. Mechanical Division is called upon to render decisions on a large number of questions and controversies which are submitted from time to time. As these matters are of interest not only to railroad officers but also to car inspectors and others, the Railway Mechanical Engineer will print abstracts of decisions as rendered.)

Failure to Secure Protection at the Point of Interchange

On August, 1928, the Charleston & Western Carolina applied one pair ot new cast-iron wheels and one second-hand 80,000-lb. capacity axle to the Akron, Canton & Youngstown car 503 at Spartanburg, S. C. When the car was received from the Southern it was shopped for defective wheels. The C. & W. C. later claimed the car had a cut journal but the Southern declined to issue a defect card, taking the position that the car had a seamy journal. The Southern stated that when the car was received by the C. & W. C. it was shopped for wheel defects, owners being responsible, and that at that time there was no exception taken to the condition of the axle, nor were any exceptions taken to the condition of the axle after the wheels were removed, nor during the entire time the wheels remained on hand at Spartanburg, which was from August 8, to August 20, 1928. The Southern maintained that the C. & W. C. made no request for defect cards

covering the cut journal until September 15, or 38 days after the wheels had been removed from the car and not until the wheels had been shipped from Spartanburg to the C. & W. C. shops at Augusta, Ga. The Southern contended that if there was a cut journal on the axle removed from this car when the wheels and axles were received at Augusta, the journal was cut either in loading the wheels, while in transit, or in unloading the wheels at Augusta, and that decisions in Arbitration Cases 1291, 1350, 1447, 1513 and 1584 would apply.

The following decision was rendered by the Arbitration Committee: "In case of delivering line responsibility for any defect existing when car is offered in interchange, the receiving line should protect itself by requiring defect card at the time they receive the car, as per Rules 2 and 4. Decisions 1276, 1291, 1324, 1447, 1513 and 1584 apply. With reference to the question of responsibility for seamy journal, if there is evidence of previous or present heating of such defective journal, delivering line is responsible, as noted in Decision 1601."—*Case No. 1636—Charleston & Western Carolina vs. Southern.*

Wheels and Axles Removed Within 60 Days

On March 27, 1928, the Denver & Rio Grande Western applied one pair of second-hand wheels to Commercial Car Line car 1210, replacing wheels which were slid flat. On May 23, 1928, the Atchison, Topeka & Santa Fe removed the wheels applied by the D. & R. G. W. and applied new wheels on account of one wheel being chill worn. The owner contended that since the wheels did not give the 60 days' service required by Interpretation No. 10 of Rule 98, the D. & R. G. W. should assume the cost of the second application with the exception of a charge for secondhand wheels.

The D. & R. G. W. contended that, at the time the wheels were applied, they were inspected and accepted as serviceable by its wheel-shop and repair-track foreman. It stated that, according to its understanding of Rule 98, Interpretation No. 10, the company making the initial repair must furnish adjustment for dust guards, brasses, box bolts, labor and the difference in value between secondhand and scrap for the wheel if only one is defective, the car owner to assume the difference in value between new and secondhand wheels. The D. & R. G. W. stated that the owner was allowed adjustment on that basis.

The decision as rendered by the Arbitration Committee follows: "The position of the Denver & Rio Grande Western Railroad is sustained, in accordance with last sentence of Interpretation No. 10 to Rule 98." *Case 1639—Commercial Car Line vs. Denver & Rio Grande Western.*

Responsibility for Damaged Car

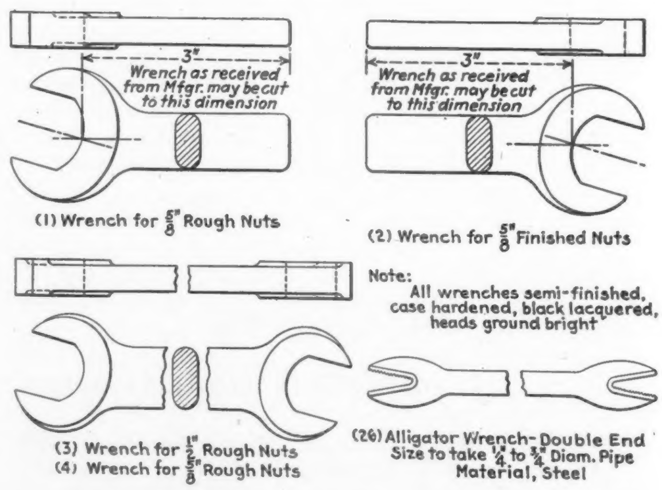
Southern Pacific car 23867 was damaged on April 14, 1929, while being handled by the Denver & Rio Grande Western, as the result of the engine slipping while moving up grade. The car was not derailed, the damage being due to the failure of draft arms and the body bolster. The car pulled apart at the transom and the end of the body rested on the truck side and on R. & L. No. 1 axle. The fish-belly center sill also sagged and rested on R. & L. No. 2 axle of the truck at the B end of the car. In order to clear the main line, the car was turned completely over with the aid of a clam shell, which resulted in considerable damage to the superstructure at the B end of the car. The owner contended that the failure of the draft arms with the resulting damage was directly due to the engine slipping and that the slipping of the engine was the result of too much tonnage. It also contended that the damage incurred as the result of rolling the car over to clear the right-of-way is the responsibility of the handling line. The D. & R. G. W. stated that the tonnage of the train was less than the rated tonnage for the class of engine hauling the train and contended that the damage of the car should be the owner's responsibility. It further contended that the damage to the superstructure at the B end of the car is of no consequence, as it understood that it would have been necessary to renew all the siding and lining at the repairing line's expense in case the car owner had authorized repairs within 30 days after it was notified as provided under A.R.A. Rule 120.

The following decision was rendered by the Aribitration Committee: "Car was not subjected to any unfair usage under the provisions of Rule 32, nor did car body fall to the ground. Therefore, owner is responsible for the failure of car. However, handling line is responsible for that portion of the damage incurred by turning the car over to clear main line." *Case 1638—Southern Pacific vs. Denver & Rio Grande Western.*

Tool Kit for Cleaning Air Brakes

By Air Brake Supervisor

THE adoption of rules governing the maintenance of air brake and air signal equipment on locomotives and cars, which were formulated jointly by the I.C.C. Bureau of Safety and the Safety Appliance Committee, A.R.A., makes it essential that those charged with the work of cleaning air brakes be equipped with adequate tools for doing the work. The list of tools and equipment shown in the table will enable the car repairmen, who change triple valves, clean and test



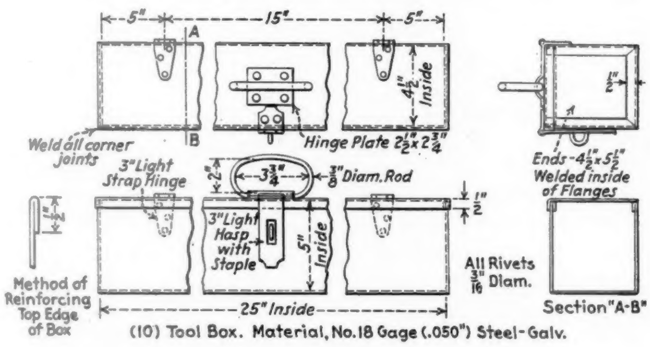
Wrenches included in the air-brake cleaner's tool kit

brake cylinders, etc., to do a job which will more than meet the requirements of Interchange Rule 60.

List of Tools and Equipment for Cleaning Air Brakes

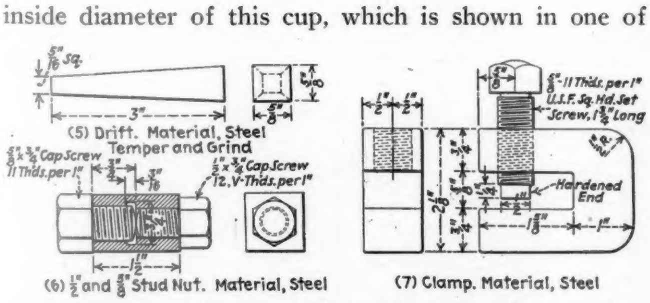
No.	Description
1	Wrench for 5/8-in. rough nuts
1	Wrench for 5/8-in. finished nuts
1	Wrench for 1/2-in. rough and finished nuts
1	Wrench for 5/8-in. rough and finished nuts
1	Drift
1	1/2-in. and 5/8-in. stud nut
1	Clamp
1	Poker
1	Scraper and cotter pin opener
1	Cylinder test gage and fittings (Ashton)
3	10-in., 18-in., and 24-in. Stillson wrench
1	1 1/2-lb. No. 2 ball-pein hammer
1	3/4-in. flat-cold chisel, 5 in. to 7 in. long
1	3/4-in. round-nose chisel, 5 in. to 7 in. long
1	Brass stencil
1	Soap-suds brush
1	Stencil brush
1	Black paint brush
5	Cans 3 3/8 in. in diameter to 3 3/4 in. deep
—	Supply of 8-in. and 10-in. brake cylinder packing cups
—	Supply of gaskets, piece Nos. 2427 and 4886
1	Single car testing device, Westinghouse piece No. 7711[1]
1	Alligator wrench
As ordered	Tin containers
1	Tool

One of the most important items included in the list is the cup for measuring brake cylinder lubricant. The



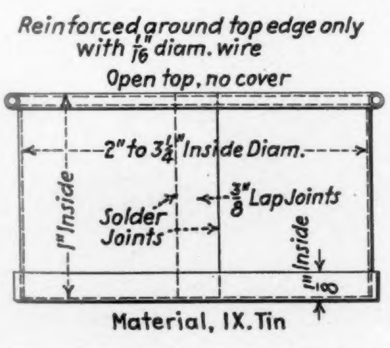
Tool box for air-brake cleaners

inside diameter of this cup, which is shown in one of

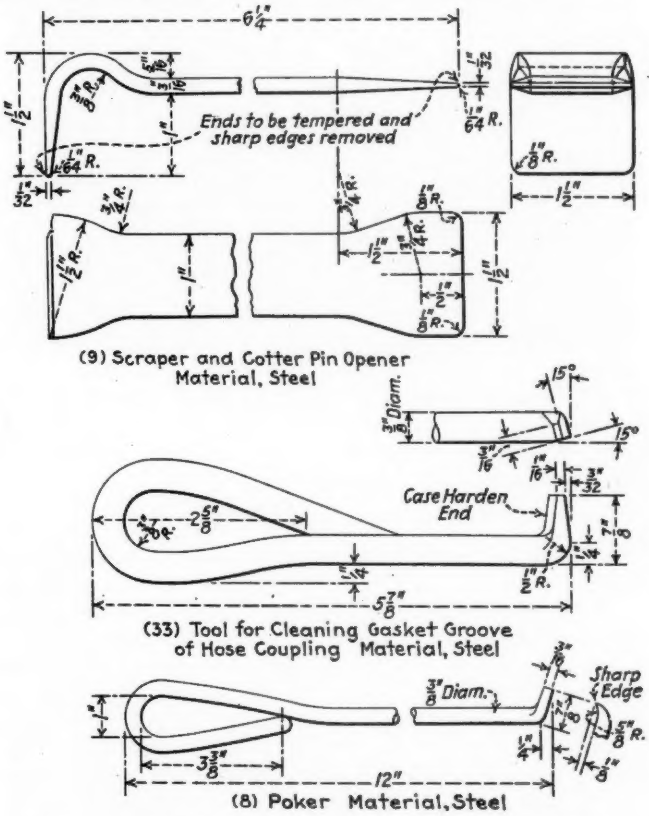


Three useful items in the air-brake cleaner's tool kit

the drawings, varies in six sizes from 2 in. to 3 1/4 in. inclusive. The 2-in. cup is for 8-in. brake cylinders, 2 1/4-in. for 10-in. cylinders, 2 1/2-in. diameter cups for 12-in., 2 3/4-in. for 14-in., 3-in. for 16-in. and 3 1/4-in. cups for measuring the lubricant for 18-in. brake cylinders. Each cup is stamped with the diameter of the brake cylinder for which it should be used to measure lubricant. The use of these cups insures that the correct quantity of lubricant is applied and is an



Cup for measuring brake-cylinder lubricant



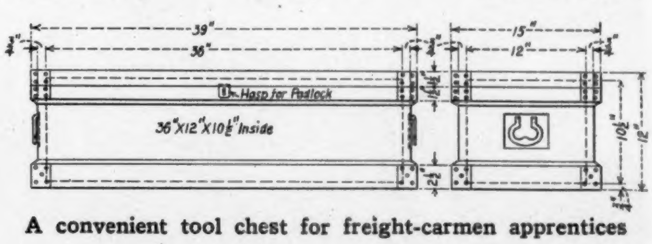
Three handy hooks for use in cleaning air brakes

important factor in eliminating waste of lubricating material.

A feature of the tools included in this kit are the three hooks which are also shown in one of the drawings. These hooks are of steel and can be easily forged in the blacksmith shop. The wrenches shown are of commercial design.

Tool Chest for Freight Carmen

SHOWN in the drawing is a tool chest which has been adopted as standard on an eastern railroad for freight-carmen apprentices. The inside measurements are 36 in. by 12 in. by 10 1/2 in. It is made of oak or



A convenient tool chest for freight-carmen apprentices

maple and is reinforced at the corners with 1-8-in. sheet metal. A till 12 in. by 5 in. is provided for bits, small tools, etc.

In the

Back Shop and Enginehouse

I. C. Erecting Shop Practice at Paducah

IN one of the largest and best equipped locomotive repair shops in the country, it is not surprising to find particular attention paid to the provision of special devices and methods for expediting work in the erecting department. This is the case at the large modern shops of the Illinois Central at Paducah, Ky. With 25 working pits served by a 250-ton gap crane and two 15-ton cranes for handling lighter material, a normal monthly output of about 35 Class 1, 2 and 3 repairs to heavy power is maintained. Numerous shop devices, often simple in themselves, save a large amount of time and labor in the aggregate.

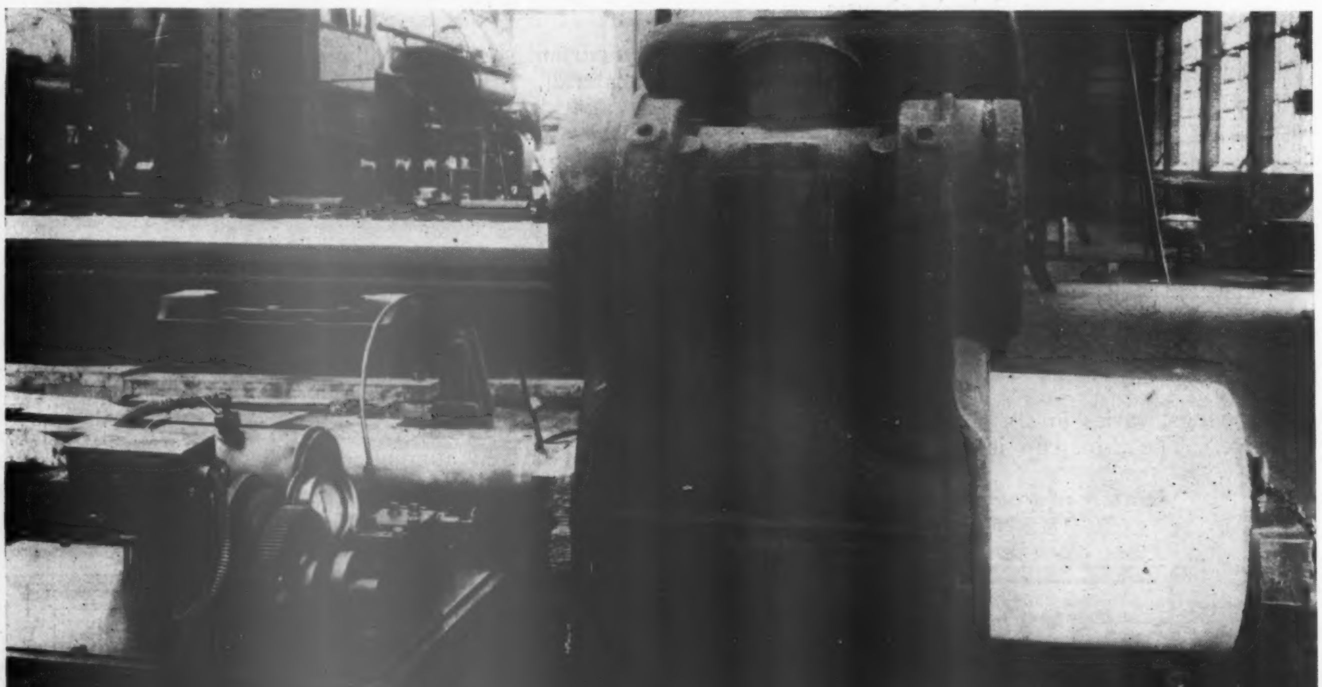
Frame Trestle—Steel Tool Box

Locomotives, after being unwheeled, are moved by the gap crane to their respective pits, being lowered onto steel trestles, one at the front end under the cylinders and the other at the rear under the firebox. These trestles are made of scrap locomotive frames cut to the required length, as shown in one of the illustrations, and having the pedestal jaws offset and slotted to give a good bearing on the rail head and substantial lips extending down on the inside. Heavy triangular plates of the shape shown are applied by welding to the pedestals, increasing the bearing surface on the rail and giving increased rigidity. This pedestal is a safe, compact design, which avoids the necessity of using blocking and timbers and does not interfere either with trucking operations around the locomotive or with the movement of workmen in the pit underneath.

A number of effective designs of tool benches, lockers and boxes are in use at Paducah shops, one of the standard portable boxes being shown in the illustration. This is a compact, welded steel box with interior shelves and compartments designed to suit the individual needs of the mechanic or gang using it. The all-steel wheels are made of two welded center-plates with a section of boiler tube of the required length split, bent in the form of a circle around the center-plates and securely held in place by welding.

Lagging Platform

Every effort is made at Paducah erecting shops to facilitate work around the locomotive and save the time and effort of men engaged in the various repair operations. Portable steps of substantial design and reaching entirely across the pit are provided at the rear of each locomotive and give ready access to the cab. One of these step sets is shown alongside of a locomotive in an illustration. In cases where heavy boiler work is being performed, necessitating a large amount of reaming and tapping at various points around the boiler shell, a light steel framework is applied, having



Powerful hydraulic-cylinder pulling device used to apply bushings in about one hour, including set-up time

a contour similar to that of the boiler and equipped with longitudinal rods, from which counterweights are suspended to balance the pneumatic drills and hammers, in many cases permitting one man to do work formerly requiring two. This arrangement has the added advantage that the pneumatic tools are suspended by the counterweights and do not have to be lowered to the floor or a bench and then lifted again after each operation. The steel framework is clamped to the boiler in such a way as to be quite rigid and provide a safe support for the air tools.

A strong and safe platform which greatly facilitates the application of lagging to locomotive boilers is also shown in this illustration. The steel platform is supported by brackets on two 5-in. vertical steel pipes provided with drilled holes for the insertion of pins to give necessary variations in height adjustment. The 5-in. supporting pipes are connected together by two tie rods and mounted in heavy circular base plates provided with boiler-plate extensions in the direction of the pit to give added resistance to tipping of the platform in that direction. The platform is provided with a suitable guard rail in the interest of safety and is large enough to accommodate a lagging skid and support it at an elevation most convenient for the lagging crew. All carrying of lagging buckets up and down ladders is avoided and, moreover, it will be noted that with this arrangement almost no floor space is occupied by the lagging platform and, hence, there is a minimum interference with trucking operations. The illustration showing the lagging platform also indicates the general use of skids to keep brake rigging, springs and similar material off the floor.

Valve-Bushing Reamer

A valve bushing reamer which has given good service at Paducah shops is illustrated. This reamer, made in 12-in., 14-in. and 15-in. sizes, has cutters ground by increments of sixteenths of an inch from the base size to 1/4 in. larger. The mild-steel center, 1 1/2 in. thick by 5/8 in. less in diameter than the base cutting diameter, is machined to receive 14 tool bits equally spaced and secured in place by locking pins, 2 5/8 in. long, and machined to a Morse No. 9 standard taper. The high-

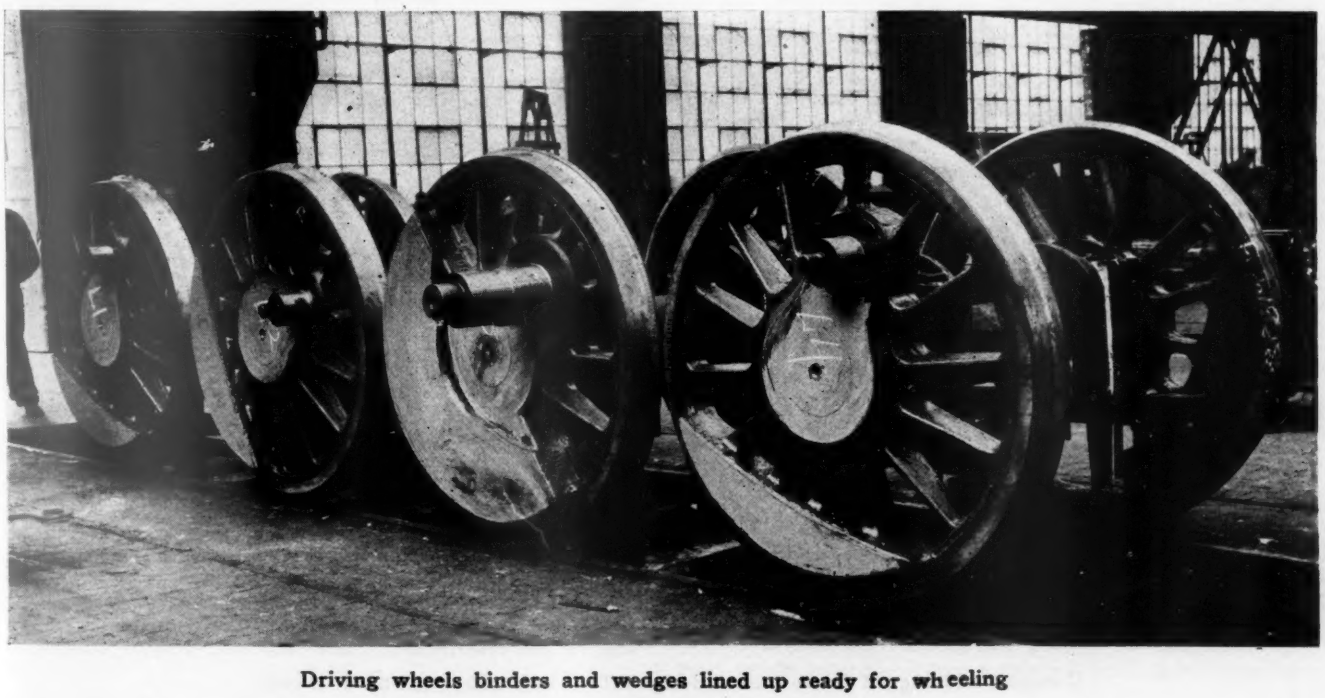
Heavy boiler-tube trailer designed to negotiate sharp curves —The wheels have lead tires

speed steel tool bits are made from worn bolt-cutter dies; in fact, the reamer was especially designed to use the tool bits. In grinding the tool bits after assembly in the reamer, the clearance given is slight in order to avoid chattering. Each set of valve-chamber reamers, stamped with individual reamer sizes, is carefully handled and kept in a special heavy wooden tool box when not in use.

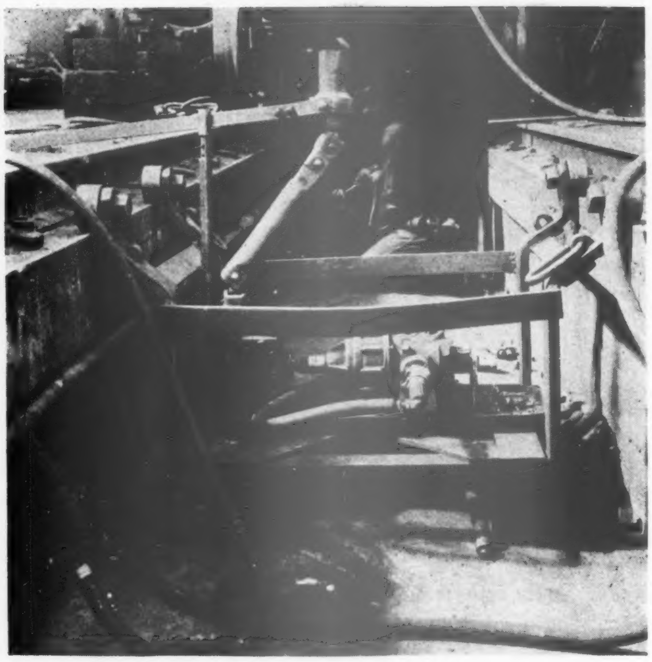
In boring valve chambers, the boring bar is set centrally with respect to the counterbore of the valve bushings and the bushings bored smooth, usually with one cut. This is made possible largely by the heavy 4-in. boring bar used in the heavy-duty Underwood portable boring unit illustrated. The total time of set-up and machining valve chambers with this method is reduced from 2 1/2 hr. to 1 hr. per side of the locomotive.

Cylinder Bushing Puller

A special device used for the removal and application of cylinder bushings is shown in one of the illus-



Driving wheels binders and wedges lined up ready for wheeling



Convenient and powerful binder nut-tightening device

trations. It is driven by a one-horsepower electric motor, geared down to drive a small pump which furnishes hydraulic pressure through a suitable copper pipe of small diameter to a steel cylinder 8 in. in inside diameter and having a 24-in. stroke. This cylinder, made from a car axle and equipped with a leather-packed piston, develops in excess of 100 tons of pressure and can be used to apply bushings quickly in two pulls. Approximately five hours were formerly required for the application of cylinder bushings, and the use of the step size, permitting the bushing to be applied half way without pressure, cut this time 50 per cent. The use of the puller device has cut the time in two again, making practically a one-hour job, including set-up of the bar. The entire motor, pump and control equipment is mounted on a platform skid which can be readily moved from place to place about the shop by means of a lift truck.

While the method of wheeling locomotives at the Paducah shops is still in process of improvement, the present method offers substantial advantages over the old way of stationing one man at each driving box as the locomotive is being lowered in order to assist in entering the frame jaws in the driving box shoe and wedge ways. By means of holes suitably located in the rails at the wheeling station, and the application of small V-blocks, the driving wheels are properly spaced when first moved to the wheeling track. The binders and wedges are assembled on blocks so that when the locomotive is lowered the only job remaining to be done is to apply two nuts and pull the binders into place. The locomotive is then moved back to its pit for finishing operations, a binder-nut tightener being used to apply the rest of the nuts. Only four men are required for wheeling a locomotive by this method as compared with eight or more by previous methods. The time required has also been substantially reduced.

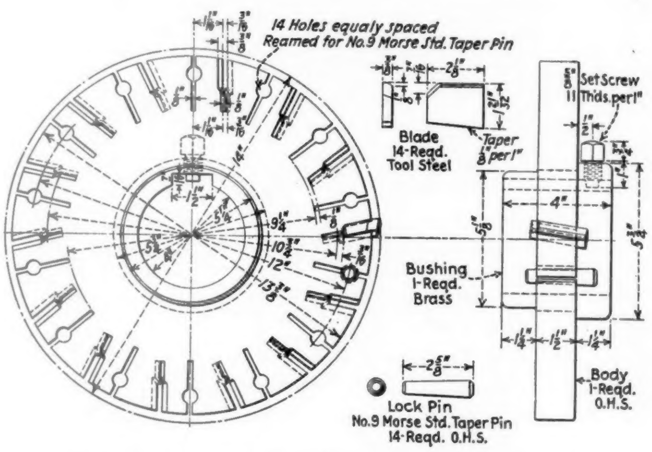
The binder-nut tightener consists of a steel framework mounted on four truck wheels, which track on the angle-iron edges of the pit. By means of these wheels, ready movement of the device in the pit under a locomotive is provided. A Thor No.5 air motor furnishes the power through a bevel gear box and a universal joint connection to the head of a socket wrench which engages the binder nuts. A convenient light lever arrangement permits holding the socket wrench against the nut, keeping it engaged. The air motor and gear box are mounted on a steel plate held by a pin but arranged to swivel so that binder nut on either side of the locomotive can be reached. In removing binder nuts, it is usually necessary to start both the main and check nuts which can then be turned off by the use of this device in a fraction of the time required with a hand wrench. In reapplying nuts, they are turned up until the air motor stalls, at which time they will be found applied somewhat tighter than with the usual hand wrench application.

Shop Trailers Have Lead Tires

A feature of the entire operation at Paducah shops is the use of about 150 lift trucks, tractors and trailers to save labor in handling material. So far as possible, material stripped from locomotives is placed in steel

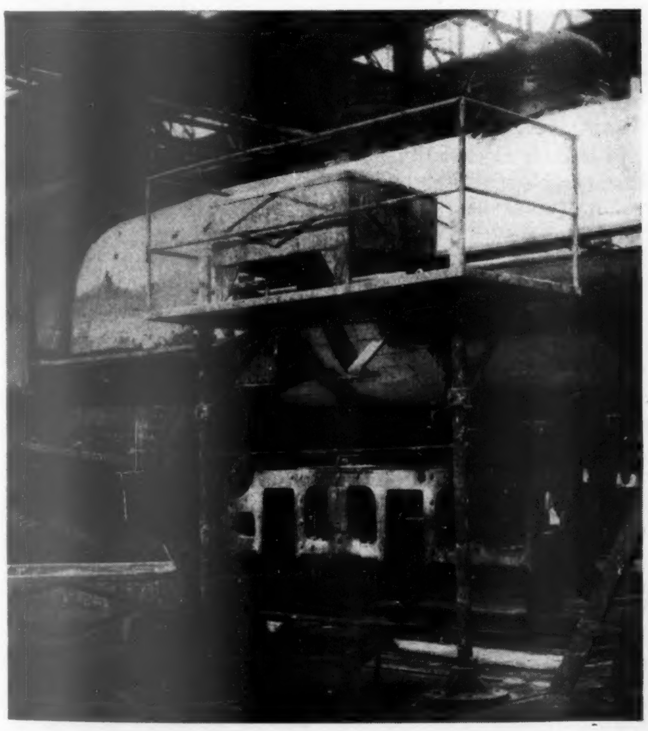
Compact and rugged frame trestle design—Tool box with steel-tired wheels

baskets or skids and handled by lift trucks directly to the cleaning tanks or to the various shop departments, being returned to the locomotive in the same way. Substantially designed skids are provided for such heavy parts as springs, brake rigging, binders, rods, etc. One of the trailers which greatly assists in handling boiler tubes and flues is shown in an illustration. This trailer has a heavy steel frame built up entirely by welding and is designed so that, after being used to transport tubes and flues to the rattler, it fits in the trestle at the other end of the flue shop and receives the flues again after being safe ended. It will be observed from the illustration that both the front and back wheels swivel, being connected by diagonal bars in such a way that when the front truck is swiveled to the left, for example, the rear truck turns to the right, thus greatly shortening the radius of the curve which the truck can negotiate. The truck wheels shown are equipped with lead tires.

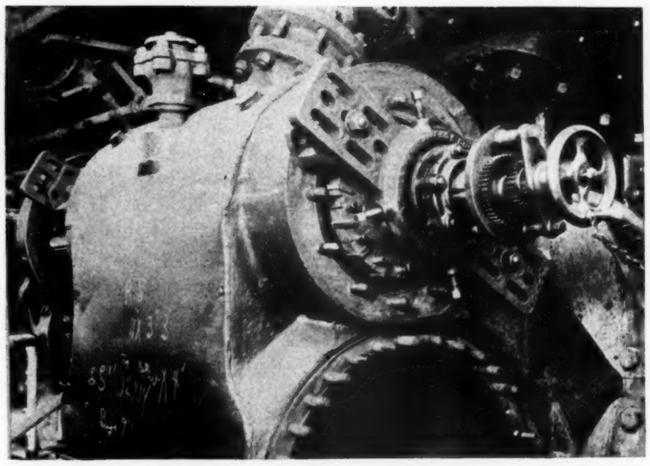


Construction of the 14-in. valve-bushing reamer

The use of lead tires in this connection is a new departure which holds considerable promise for economy.



Adjustable lagging platform which is both safe and a labor saver



Type of valve-bushing reamer which finishes bushings smoothly in one cut and in step sizes

Of the trailers used at Paducah shops, 21 are already equipped with lead tires and it is anticipated that within the next year 75 per cent of the remaining trailers will be equipped.

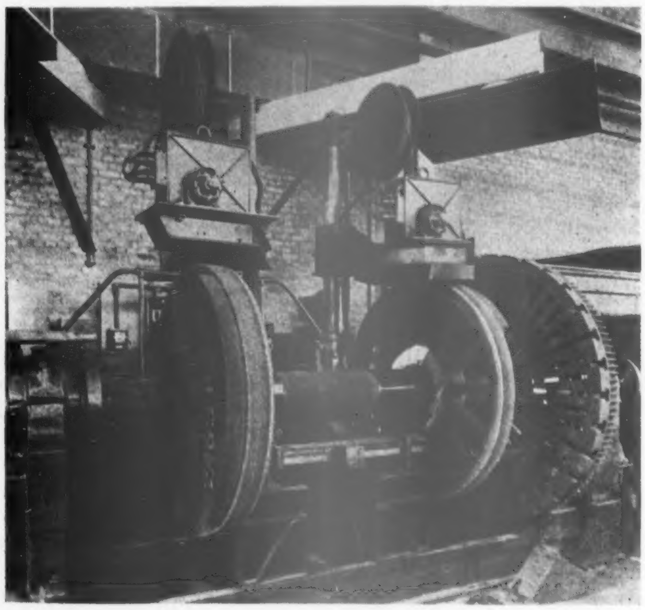
The wear on trailer tires, particularly when transporting heavy material over steel rail crossings in the shop, as well as outside, is severe, and numerous expedients have been tried at Paducah to reduce the expense. Cast-iron wheels or steel wheels damage the roadway. Rubber tired wheels are satisfactory from this point of view but are relatively expensive and short-lived. A special all-wood wheel has been tried, costing somewhat less than the steel wheel rim and rubber tire, but already giving indications of excessive wear and a probable life of not over one year. The lead-tired wheels however, costing about nine dollars less per tire than rubber-tired wheels, give every indication of a service life of not less than 10 years. The construction of this wheel consists of a rough cast-iron center which is thoroughly cleaned by sandblasting, then being placed in a sand mold together with a metal rim of the same thickness as the desired lead tire. This rim is jarred loose from the mold and its place filled with a special lead alloy consisting of tin, 43 per cent; lead, 51 per cent; antimony, 5 per cent; and copper, 1 per cent. The alloy is readily mixed, melted and poured from a crucible. The difficulty with lead tires is in getting a composition which will not be too brittle and break, on the one hand, or too soft and mushroom on the other. The composition mentioned has been found to give satisfactory results.

Machine Welding on Driver Rims

THE Chicago & North Western has secured unusually satisfactory results in maintaining the diameters of locomotive driving-wheel centers by means of automatic electric arc-welding. An old wheel lathe, installed at the Chicago shops of this road, has been redesigned so that it swings a 74-in. wheel center; spindle revolutions vary from 3 to 9 per hour, and feeds vary from 1/8 in. to 1/4 in. per revolution. Two Westinghouse automatic welding heads have been applied as illustrated. The electrical equipment includes two 300-amp. Westinghouse portable welding sets.

The undersize wheels are placed in this lathe and runs made over the worn surfaces until they have been

built up the required amount. Using 3/16-in. welding wire, a pair of 68-in. driving-wheel rims can be surfaced in 9½ hours. The wheels shown in the machine were only slightly smaller than standard and required but one run. For most wheels, however, two runs must be made in order to obtain sufficient stock for turning. A good average time for two runs is 20 hours per pair of wheels, which may be compared with about 74 hours by the hand welding method.



Driving-wheel lathe at the Chicago shops of the C. & N. W., equipped with modern Westinghouse automatic welding heads for building up wheel-center rims

The accompanying table shows the comparative cost of welding a pair of wheel centers by both the automatic and hand-welding methods, clearly indicating the advantage of the former and also the advantage of having two of the automatic heads in operation at the same time. The welding cost on two centers by hand is, of course, double that on one, whereas the automatic cost on two is approximately 30 per cent more than on one, because the labor and the overhead on the labor is the same in either class.

How the wheel centers look after turning and just before application of the new tires

Comparative Wheel-Center Arc-Welding Costs

Two wheel centers built up on Engine 1560	
1 wheel, turned down to 67 11/16 in., built up to finish 68 in.	
1 wheel, turned down to 67⅝ in., built up to finish 68 in.	
¼-in. material applied all around.	
Cost of welding by hand:	
74 hr. labor at 85 cents per hr.	$62.90
150 lb. welding wire at $6.75 per cwt.	10.12
576 kw.-hr. electricity at .01 cent per kw.-hr.	5.76
33 per cent overhead on labor	20.75
2 per cent overhead on material	.32
Total cost by hand	$99.85
Cost of automatic welding:	
20 hr. labor at 85 cents per hr.	$17.00
200 lb. welding wire at $8.25 per cwt.	16.50
180 kw.-hr. electricity at .01 per kw.-hr.	1.80
33 per cent overhead on labor	5.61
2 per cent overhead on material	.36
Cost by automatic	$41.27
Saving of automatic over hand welding, per pair	$58.58

The North Western practice is to build up the under size wheel centers on all locomotives which go through the Chicago shops and also to bring in non-standard centers from outside points. It is estimated that with 500-amp. welders and 5/16 in. welding wire, one run would be sufficient for practically all undersize wheel rims.

Superheater-Unit Grinding Tools

PROBABLY the most effective and best method of reconditioning superheater-unit joints, both in the header and on the ball ends of the units, is by means of the standard 45-deg. taper and ball-seat tools, driven usually by air motors and fitted with emery-cloth discs to do the cutting. It has not always been easy, however, to keep these discs or blanks centered in the tools or to keep them from slipping. To overcome this difficulty the tools shown in the illustration have been developed and used successfully at the Chicago shops of the Chicago & North Western.

The tool at the extreme right consists of a punch for blanking out the emery-cloth discs of the proper size. The circular centerplate in this punch is guided by four screws, and, being spring-supported at the back, serves to force each blank out of the punch after it has been formed by a single stroke of a hammer. The emery cloth is supported on the end grain of a large wood block. It will be noted that a small steel point at the center of this punch pierces the emery cloth, leaving a hole accurately located in the center.

The crease-forming die and header, shown at the left in the illustration, are used to make necessary creases in the emery-cloth blanks and shape the blanks to a 45-deg, angle so that they will fit the grinding tools. These tools are designed with projecting center points to enter the hole in the emery-cloth blank. Four milled grooves accommodate the creases in the cloth and prevent its turning when given a rotary motion under pressure against the superheater header or unit ball joint, as the case may be. The die head has four radial inserts fitting corresponding grooves in the die proper to form the creases in the emery cloth blank. Two pins on either

side of the head, sliding in suitable lug holes on the side of the die, properly position the steel inserts with respect to the grooves. A single blow with a light wooden mallet is all that is necessary to crease the cloth, a heavier blow being objectionable on account of the probability of fracturing the cloth. The same cloth blank can be used in either of the grinding tools shown in the center of the illustration.

The principal merit of this method of providing

Superheater-unit grinding tools and the punch and dies for cutting and creasing emery-cloth blanks

emery-cloth blanks and grinding tools for superheater-unit joints is its simplicity and the fact that the blanks are held central by the small center pin and positively prevented from turning by four creases which fit corresponding grooves in the grinding tools. Once the superheater header joints are accurately machined to 45-deg. and the units ball ends accurately formed to a segment of a sphere the use of these regrinding tools will be found to maintain the joints in a standard condition with little effort.

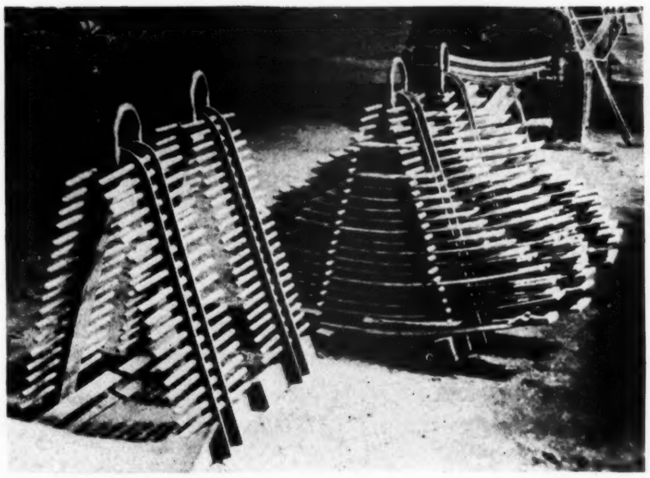
Accessories in Spring Making

IN the illustration is shown a set of cooling racks, each holding two sets of leaves. They are used to secure the proper normalizing of the spring leaves when reworking old springs. The rack is made from a scrapped Ajax brake beam, bent to an inverted V-shape, with 20-in. sections of angle iron welded to each end of the beam. A loop of ¾-in. rod is welded to the top of each rack to serve as a handle.

A series of 9/16-in. rods, 14 in. long, are inserted 1¼ in. apart in the beams. By placing the longest leaf at the bottom and the shortest one at the top, with the bows down, there is no warping. The heat rising from the longer leaves, which hold the heat the longest, keep the short leaves from cooling too fast.

The testing of springs has been facilitated in the shop in which this rack is used by the installation of a gage in the air line between the supply valve and the cylinder of the banding and testing machine. The gage is used to insure the correct application of air pressure while the springs are being tested. A chart has been prepared showing the various loads and air pressures at which the springs are tested. The first column of this chart shows the load; the second, the air pressure that is to be applied to the type of spring in the machine.

The spring is first measured for set. The air valve is then operated until the pressure reaches the prescribed figure for the rest. The air is released and the



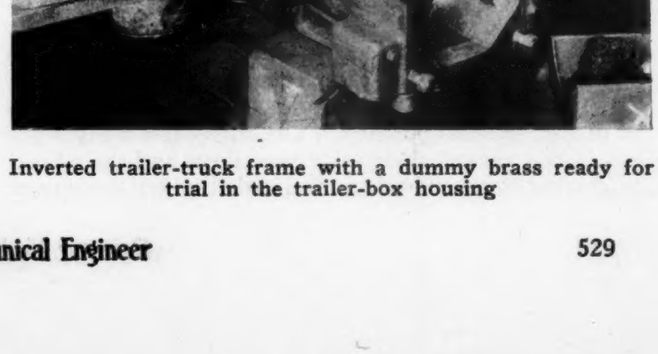
Cooling rack used for holding two sets of spring leaves

operation repeated four times, after which the spring is measured for permanent set, which must not exceed ¼ in.

One Reason for Hot Trailer Boxes

IT not infrequently happens that when necessary to change a worn-out trailer brass at the enginehouse the new brass runs hot, the reason sometimes being that positioning lugs in the trailer box are not standard and prevent the heavy thrust being transmitted squarely from the journal through the brass to the bearing in the trailer box. The explanation is simple. At the last major shopping or conditioning of the locomotive, this non-standard location of the positioning lugs, due either to wear or improper original design, was not corrected but, instead, the new brass was chipped to conform to the lugs. The enginehouse forces have no means of knowing this and, when renewal is necessary, apply a standard brass with subsequent trouble.

The way to overcome this difficulty is to insist on the back shop making a careful inspection when the trailer truck is removed from the locomotive and is in a position to be readily inspected. The positioning lugs can then be chipped, or welded and chipped, to conform to standard blueprint dimensions. A great aid in this operation is the dummy brass shown in the illustration.



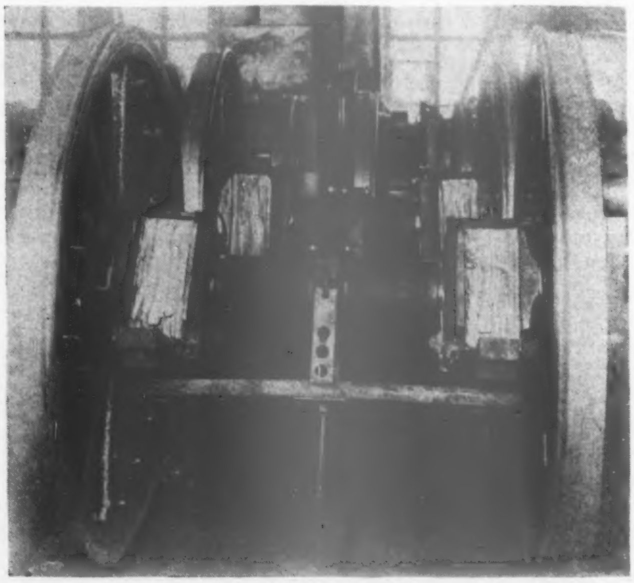
Inverted trailer-truck frame with a dummy brass ready for trial in the trailer-box housing

This dummy brass is light in weight and made 1/16 in. larger in all dimensions than the standard brass. It can be used for readily checking the location of the retaining lugs and assure holding the standard brass in the exact blueprint location. Any errors found in the location of the dummy brass with respect to the trailer box are corrected to insure interchangeability with standard brasses which may subsequently be applied at the enginehouse.

Applying Binders, Shoes and Wedges

IN the illustration is shown a device used in Oelwein shops of the Chicago Great Western for applying driving-box pedestal binders and shoes and wedges while wheeling locomotives. It is particularly adaptable for railroad shops equipped only with Whiting or other stationary hoists where it is necessary to roll the driving wheels into position under the engine while it is raised.

The device consists of a pit plank suspended under the driving boxes for holding the binders in place, the means of suspension being a ball-bearing rider made of strap iron, and two flexible iron straps attached to



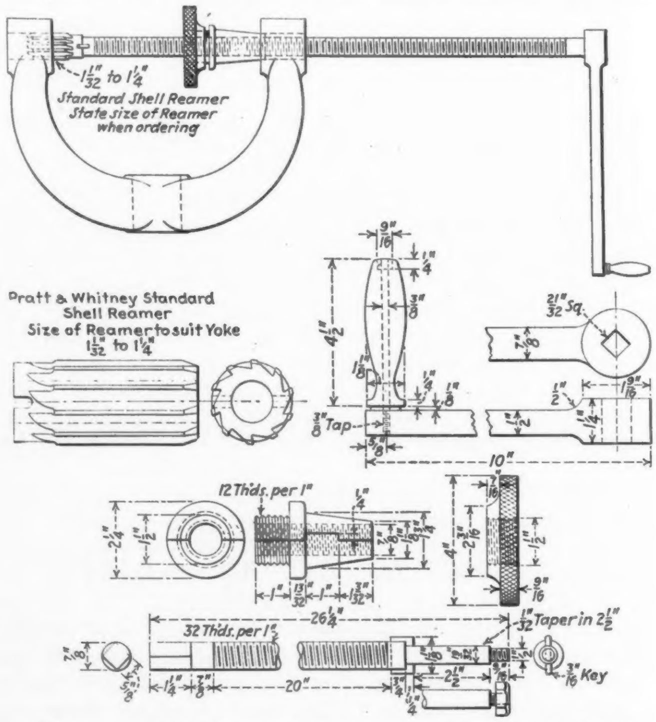
A pit plank bolted to a ball-bearing rider holds the binders, shoes and wedges in place against the box

it with chain links. These straps are drilled with three holes each to permit adjustment for the different lengths of boxes. Into a pair of these holes is hooked a forged adjusting bolt which is made with two hooks of the necessary width to clear the diameter of any driving axle. The entire length of the bolt is threaded so as to permit the adjusting nut to hold the pit plank tightly against the binders.

The method of applying this device is to turn the boxes upside down, place the binder in position across the bottom of the boxes, the pit plank across the binders, apply the suspension parts and roll the boxes back into the proper vertical position. The shoes and wedges are then placed against their respective faces and the wheels are carried to the wheel pit and rolled under the engine after it has been raised, the engine being lowered in the usual manner, automatically applying the shoes, wedges and binders into position. This leaves only the operation of applying the nuts and tightening the binders into place. At the Oelwein shops, this saves six to nine man-hours.

A Bell-Yoke Reamer

A BELL yoke reamer designed to insure alinement of the bell yoke holes thus decreasing the probability of bells binding in the frame after assembling, is shown in the drawing. The tool complete consists of a Pratt & Whitney standard shell reamer, a threaded extension, an alinement nut with tapered sides, and a handle for operating the reamer. The extension is 26 in. long, tongued at one end to fit the reamer, and fitted at the



A reamer which insures the alinement of bell-yoke holes

opposite end with a 10-in. handle. The extension is threaded for 20 in. of its length.

When in use, the reamer is started in one of the bell yoke holes and the extension is passed through the opposite hole. The alinement nut is run on the threaded extension and fitted into the hole opposite the one being reamed. Thus, the tapered nut insures the reaming of one bell yoke hole in alinement with the one opposite. To ream the latter hole, it is only necessary to reverse the tool.

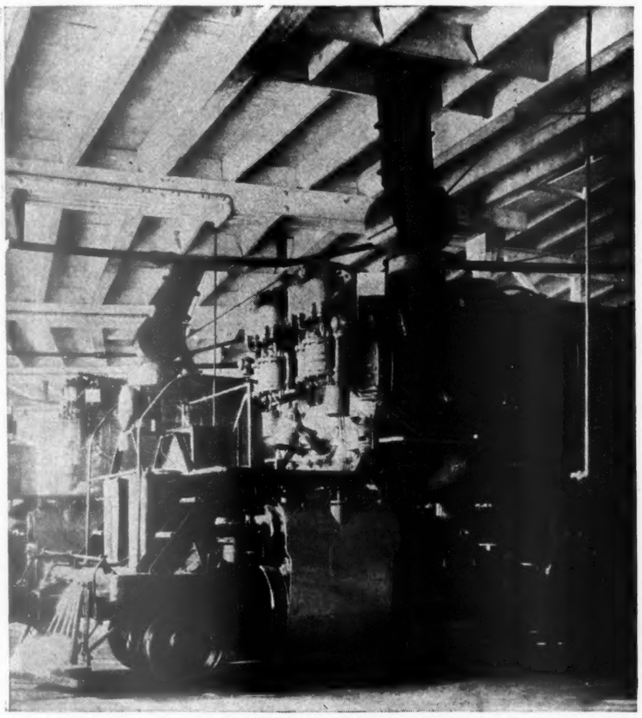
FIFTY YEARS AGO.—The president of the Master Car Builders' Association [now part of Division V—Mechanical American Railway Association] in his address at the annual convention at Detroit on June 8 made the significant prediction that the maximum load of eight-wheel freight cars will in a short time have increased from 10 tons to at least 20 tons, while four-wheel cars will be carrying from 10 to 12 tons. The committee on freight train brakes reported that it had had correspondence with 22 inventors, and gave encouragement of the ultimate success of the endeavors to produce brakes that will act independently on any car to which they are attached.—*Railway Age*, June 10, 1880.

NEW DEVICES

The Drafto Units for Blowing Locomotives

AFTER several years of experimental work with service installations, an improved, self-contained, electric-driven blower, known as the Drafto Unit, has been developed by the Locomotive Forced Draft Company, Minneapolis, Minn., for use in enginehouses to provide the draft required for firing up locomotives. The first unit of this general type was installed in the Minneapolis enginehouse of the Great Northern in 1925 and, since that time, 33 additional units have been installed at important terminals on the road.

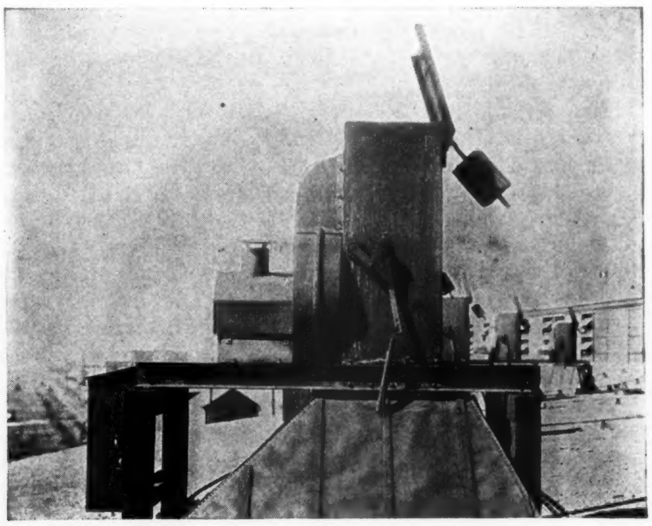
Referring to the illustrations, it will be observed



View showing smoke-duct connection to the locomotive stack

that the Drafto Unit consists of a motor-driven fan mounted on an iron frame on the enginehouse roof and arranged to induce a draft in the roof stack which is transmitted through a suitable hinged, telescoping sheet metal duct to the locomotive stack. A counterweighted inclined runway serves as the raising and lowering mechanism, being actuated by the stack of the locomotive as it comes into or passes out of the house. Draft control is provided by means of automatic dampers.

The electric motor for the Drafto Unit is rated at 7½ hp. and operates at 1,800 r.p.m. The fan, especially designed for the work, is 35 in. in diameter and comprises cast steel spiders and suitable blades mounted in a cast-iron housing. The telescoping smoke duct is made of No. 8 Armco iron, the inner sleeve being approximately 19 in. in diameter and the outer one 21 in. Suitable guides and supports are provided for the inclined runway. Drafto Units are designed to furnish sufficient draft for firing up any standard locomotive, bringing the water from a temperature of 180 deg. F. to steam at 75 lb. pressure in approximately 50 min. with an energy consumption of about 5 kw. hr. If operated with the firebox door open for hot work, the energy consumption is approximately 6 kw. per hour.



Details of Drafto unit equipment as applied on the enginehouse roof

The Drafto blower, as at present constructed, consists of a motor-driven unit. The method of operation of the Drafto Unit is as follows: As a locomotive enters the house, its smoke stack engages the stack guide and raises the stack hood and inner telescoping sleeve until it enters the hood and the locomotive is "spotted" in the usual way. The construction of the unit is such

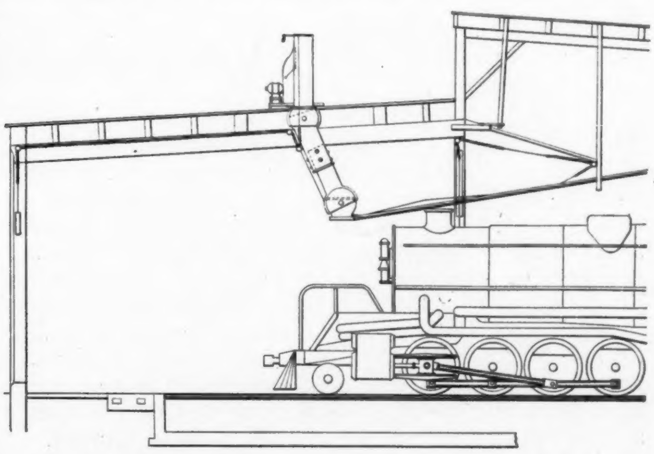


Diagram showing application of Drafto unit and method of counterweighting the hinged sheet-metal smoke duct and inclined stack runway

that raising the stack hood six inches opens a quick-acting damper on the top of the unit, giving a path for the smoke and gases direct to the atmosphere. If it is planned to have the locomotive in the stall for any length of time before it is needed again, the damper

on top of the unit may be closed by hand operation and kept in this position until the draft is required for hot work or firing. When the fire is laid and ready for lighting, the fan is started and the fire lighted. In firing up a locomotive with these units, better results are said to be obtained if the fire is made as light as possible and given frequent attention by the hostler to keep the fire thin and the grate covered. No special care is required in backing out the locomotive. As it leaves the house, the hood of the Drafto Unit follows the locomotive stack until the former reaches its limit. The stack then follows the stack guide, the telescoping sleeves, stack hood and guide automatically returning to the lowest position, ready to receive the next locomotive. Locomotives of a difference in height of 2 ft. 6 in. can be accommodated under this device, and 3 ft. 6 in in either direction from the center of the unit is available for spotting.

Many tests have been made with the Drafto Unit in regular operation and with steam blowers in order that comparisons could be made. Tests with two types of steam blowers in use by one railroad are said to have shown a consumption of steam of 2,400 lb. on the smaller unit and 3,400 lb. on the larger one, per hour. On 760 locomotives entering the experimental Drafto Unit, an average time of one hour for firing and hot work has been shown, 49 min. of which was for firing and 11 min. for hot work. Tests made with a steam blower to determine the amount of air taken from the enginehouse through the smoke jack are said to have shown an outflow of 12,000 to 15,000 cu. ft. of air per min. when the blower was operating and from 5,000 to 6,000 cu. ft. of air leaving the house through the smoke jack even with no blower in use. The design of the Drafto Unit prevents this waste and consequently simplifies the problem of heating.

The accompanying table, calculated from actual locomotives fired, existing outdoor temperatures and from the data obtained in the previous tests, indicates the amount of steam used to heat the air which is lost in this manner in a house equipped with ordinary smoke jacks. In the particular house under consideration, the jacks are not equipped with dampers and the losses go on for 24 hr. instead of 2 hr., as estimated. This house is located in approximately the same latitude as Minneapolis, Minn.

Steam Required for Heating Air Lost Through Smoke Jacks*

Month	Locomotives Fired	Av. Temp. Deg. F.	Lb. Steam Lost
January	755	12	697,300
February	584	15	508,480
March	598	28	373,750
April	555	40	194,250
May	585	52	102,375
June	580	—	——
July	846	—	——
August	693	—	——
September	852	50	149,100
October	842	49	146,350
November	687	32	343,500
December	634	15	551,550
	8,211		3,066,655

* It is assumed that firing and hot work takes one hour and the locomotive stands one hour after firing

The advantages claimed for Drafto Units may be summarized as follows:

First: A direct saving for each locomotive fired on approximately the difference between six kw. hr. of electric power at two cents per kw. hr. with Drafto Units, and 1,500 lb. of steam at 60 cents per 1,000 lb. with the steam blower.

Second: A variable but large saving in heating engine houses in those sections of the country where heating is required.

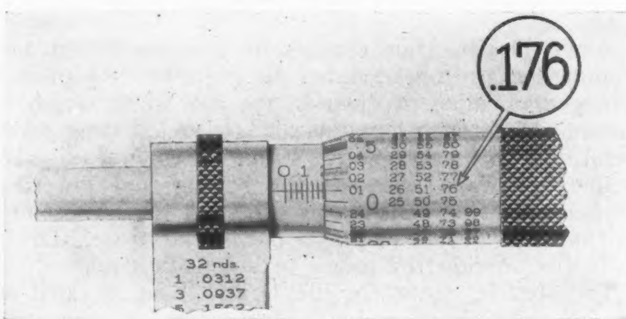
Third: The elimination of smoke and gases from the enginehouse, with attendant improved working conditions and the possibility of retaining a better class of men in employment. With little smoke or gas in the enginehouse, the life of all metal parts will be extended.

Fourth: With the substitution of electric blowers for steam, it becomes possible to use the stationary boiler plant for heating only, enabling it to be closed down during the non-heating season, thereby effecting material economies in fuel and labor.

A Direct-Indicating Micrometer

THE Lufkin Rule Company, Saginaw, Mich., has recently announced a new method of marking a micrometer. Referred to as the direct-indicating micrometer, the tool gives the total reading of the measurement by hub markings which are the same as on the regular type of micrometer. The hundreds of thousandths are indicated by a long line, the reading shown as usual by figures 0 to 9. Three shorter lines indicate .025, .050 and .075, being arranged so that they appear as a group of three. The sleeve is notched or cut away at the zero point so that with each revolution of the spindle a new line comes into view when zero is reached. A row of figures from 0 to 24 is marked on the edge of the sleeve. A group of three rows of figures, indicating 25 to 49, 50 to 74, and 75 to 99, is shown at the right, yet the figures are so arranged in spiral form that each row follows the last without jumping over.

In reading the micrometer, the last line in view on the hub is noted. If it is a long line, read in the first column at the edge of the sleeve. If it is the first short line, read in the first row of figures in the group of three. If the second short line shows, read in the second row. If the third short line shows, read in the third row. Prefix to this reading the figure indicating hundreds of thousandths. You then have the full reading without any calculations.



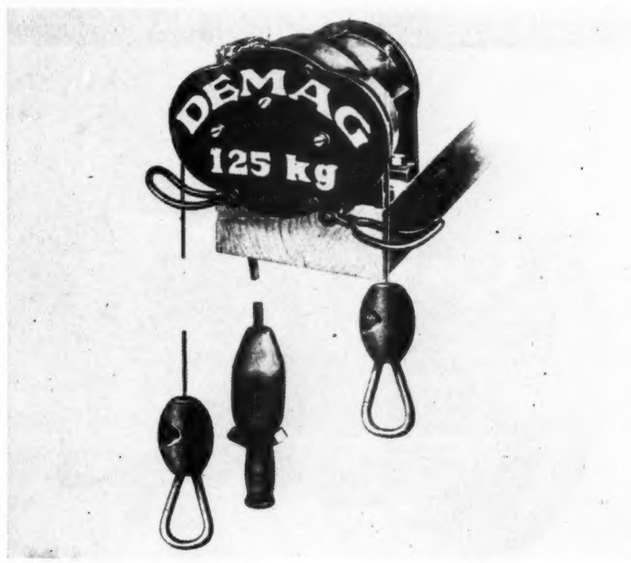
The Lufkin direct-indicating micrometer

Demag Junior Hoist

A HIGH-SPEED hoist, equipped with an electric motor, which has a normal lifting capacity of 250 to 275 lb., has recently been brought out by the Ambold Machine Tool Corporation, 50 Church street, New York. The hoist operates with two falls of wire rope which is one continual piece passing over a scored drum or sheave, each end of the rope being fitted with a suitable hook. The ends ascend or descend alternately at a speed of about 85 ft. per min. By adding a single block at the bottom, the hoist has an increased carrying capacity of 500 lb. and travels at the rate of about 42 ft. per min. The height of lift can be increased as the rope is endless and, by winding over the sheave, any limit in height of lifting is possible, depending on the length of rope added.

The hoist is equipped with a ¾-hp. motor which is standardized on a.c. current and which can be furnished in 110- to 230-volt, 3-phase, 60-cycle sizes as standard equipment. A flexible cord attached to the motor which is equipped at one end with a push-button switch is the means of controlling the hoist. However, a pull-chain switch can be provided. The hoist is equipped with a top limit safety device which shuts off the current automatically when one of the hooks hits the frame of the hoist. It is also furnished with a friction clutch which stops and holds the load on overloading or with no voltage or stoppage.

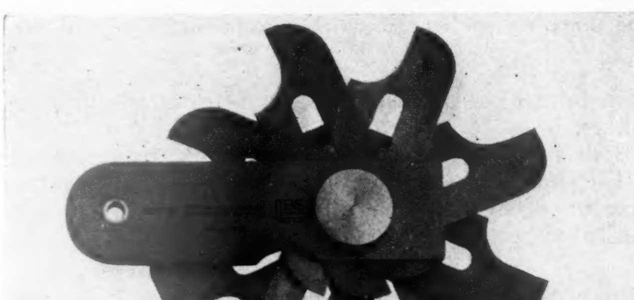
Standard equipment with the hoist includes a 35-ft. rope with two hooks, and a push-button switch at the end of an 18-ft. cable. The overall dimensions of the hoist are 6 in. by 12 in. by 14 in. and the weight is approximately 120 lb. Provisions can be made for applying the hoist to a monorail or I-beam with a trolley, the trolley being equipped with ball bearings or roller bearings.



The Demag hoist of 250 lb. capacity

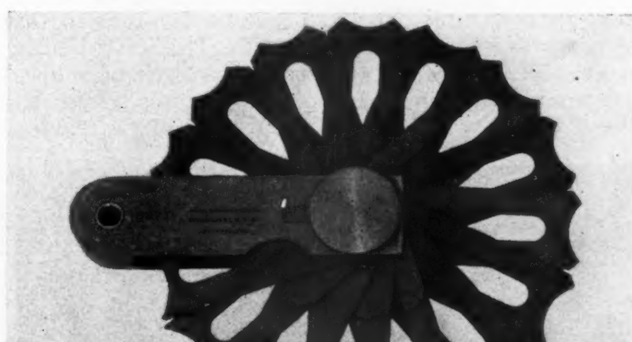
Fillet and Radius Gages

A SERIES of fillet radius gages, designed to simplify the checking of fillets and radii, have been recently announced by the Brown & Sharpe Manufacturing Company, Providence, R. I. Concave and convex radii of the same size are included on the same blade. This double-ended feature is used to reduce by one-half the number of blades necessary for a given range. The blades are long and are slotted, this feature making many blades available at one time.



The B & S 627 B fillet and radius gage

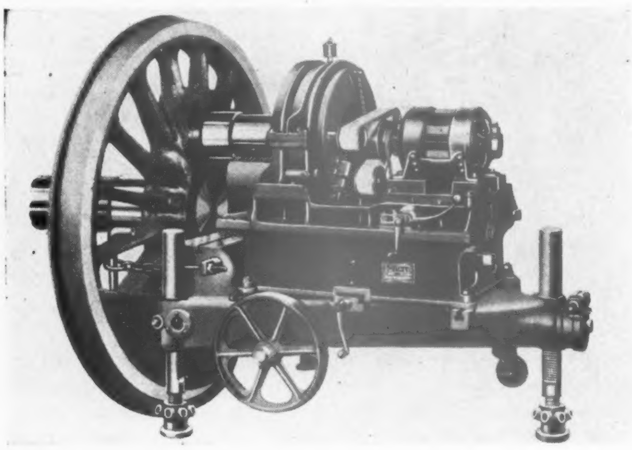
Two styles of gages are made: Nos. 627 A and B and Nos. 627 C and D. The Nos. 627 A and 627 B have a blade form which is particularly adapted for checking fillets and radii in corners or against shoulders. No. 627 A has a range from 1/32 in. to 17/64 in. by sixty-fourths, and No. 627 B from 9/32 in. to 33/64 in. by sixty-fourths. The Nos. 627 C and 627 D are especially useful in laying out forming tools and similar work. No. 627C has a range from 1/32 in. to ¼ in., and No. 627D from 17/64 in. to ½ in. by sixty-fourths.



The B & S 627 D fillet gage

Micro Crank-Pin Grinder

A PORTABLE crank-pin grinding machine, which is capable of grinding crank pins with the wheels under or removed from the locomotive, has recently been introduced in the railway field by the Micro Machine Company of Bettendorf, Iowa. The machine is provided with complete facilities for quick set-up. It is rolled up to the wheel and raised to the approximate height of the pin center with the three elevating jacks that are operated universally from one point with a hand crank. Squaring-up is accomplished by drawing the machine against the hub face of the driving-wheel with anchoring chains attached to the spokes of the driving wheel. Final centering is done by the use of a centering spider equipped with a needle pointer which swings over the end of the eccentric-crank bearing to insure concentricity of the rod bearings with the eccentric crank bearing.

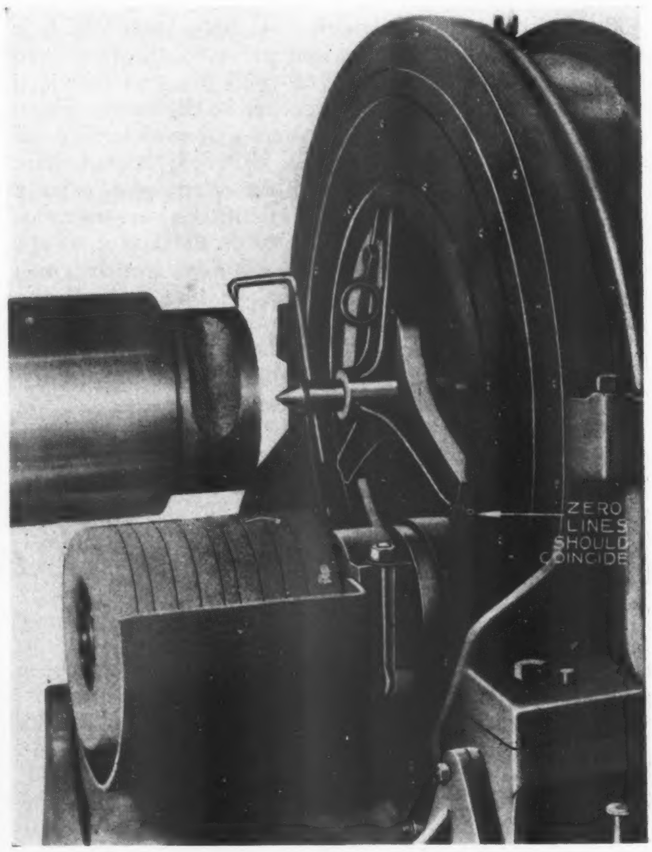


The Micro crank-pin grinder

The grinding is accomplished by a wide-faced grinding wheel or a series of grinding wheels, which covers the entire length of the pin bearing being ground. The grinding spindle is eccentrically mounted for feeding the wheel to the crank pin and provision is made so that the depth of cut may be increased. The main bearing revolves by means of an automatic feed mechanism operated from a hand knob on the operative side of the machine. In addition to going around the pin, the grinding wheels oscillate longitudinally approximately three-fourths of an inch, changing the path of the grinding wheels every one and one-third revolutions. This oscillating movement is used to insure straight and round grinding to keep the grinding wheels sharp, and to eliminate any probability of hollow grinding because of wheel wear. With various diameters of grinding wheels, the machine will grind pins ranging in diameter approximately from 4 in. up to 10 in.

The grinder can be set up with the wheels under the locomotive

Upon the lower truck frame of this machine is mounted the bed proper, which carries the headstock and driving motor. The driving mechanism of the headstock is sealed and runs in oil, while a rack feed is provided for dressing the wheels. The driving motor furnishes both the planetary and longitudinal movements to the grinding wheels and is connected to the headstock by a flat belt traveling around driving and idler pulleys.



The centering spider and series of grinding wheels of the Micro crank-pin grinder

Both steps of a main pin, which is out of round up to 1/16-in. can be finished in approximately two hours, including set-up time. Single-step or side-rod pins are finished in approximately one hour.

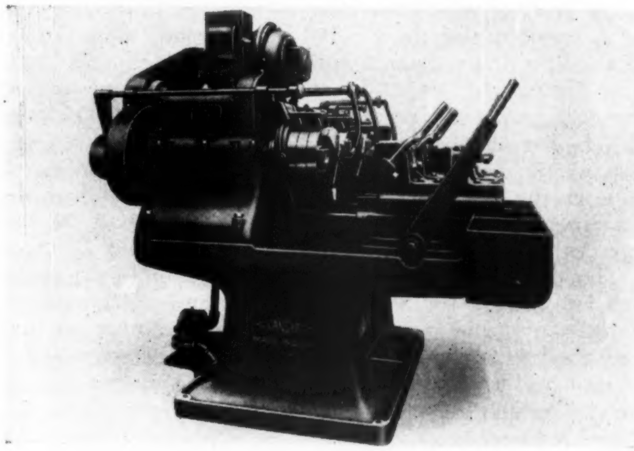
FIFTY YEARS AGO.—The Baldwin Locomotive Works has just delivered to the Philadelphia & Reading [now the Reading] for operation on its Bound Brook line between New York and Philadelphia a fast passenger locomotive with a single pair of driving wheels, 6 ft. 6 in. in diameter [4-2-2 wheel arrangement]. The locomotive is to be used to inaugurate two-hour service between the two cities. To provide greater adhesion in starting and on heavy grades the locomotive is fitted with equalizing levers located between the driving and railway wheels and operated by a steam cylinder and piston.—Railroad Gazette, May 7, 1880.

Improved Landis Bolt Threader

THE triple-spindle high-production bolt-threading unit, built by the Landis Machine Company, Waynesboro, Pa., has recently been redesigned to include a constant-speed motor drive and a pick-off gear box. With the use of a gear box of this type it is possible to obtain the most efficient threading speed for any particular job. Fifteen threading speeds ranging from 38 to 271 r.p.m. are available, using eight sets of interchangeable gears. Other speeds can be obtained by the substitution of different gears.

All shafts in the gear box are made of alloy steel and are mounted on anti-friction bearings to insure trouble-free operation under all working conditions. All bearings are lubricated by the Alemite system. The constant-speed motor is direct connected to the gear box by means of a silent chain.

A low-speed, low-pressure, large-volume pump, belt driven from a constant-speed shaft, floods the chasers and work with coolant. The entire coolant system has been redesigned to give a larger volume of coolant to the work at all cutting speeds. This machine is motor driven and it is made in 1-in. and 1½-in. triple-spindle models.

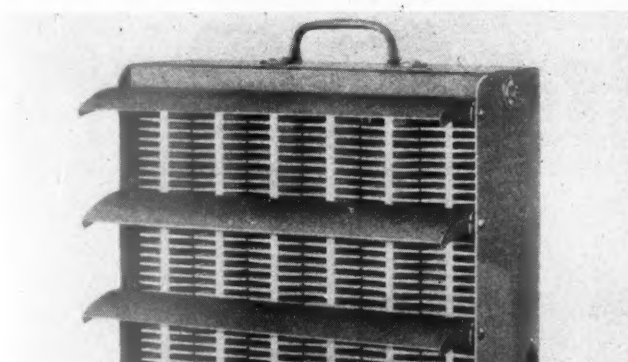


The improved Landis bolt threader includes a constant speed motor and a pick-off gear box

The machine operates at a constant speed and is designated by its manufacturers as the Landis bolt-factory threader.

American Electric Heater

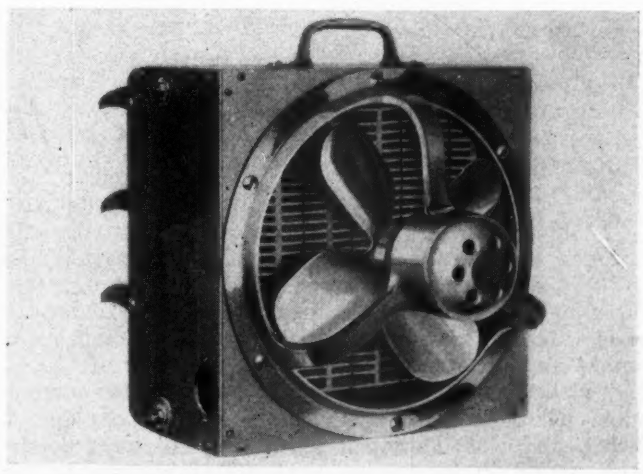
THE American Foundry Equipment Company, Mishawaka, Ind., has placed on the market a new-type electric space heater. The unit combines the characteristics of both the steam-unit heater and the electric heater in one device. Alloy heating strips are cast integrally with composite fins of aluminum alloy, making a single casting that will allow an uninterrupted flow of air through its channels. Castings of this type are then assembled in suitable number and size into a cabinet,



The American electric heater

back of which a fan operates to circulate a current of air through the heated fins.

The heater can be used for permanent installation, or as a portable heating unit. It is particularly applicable for heating isolated and temporary buildings, for intermittent heating needs in warm climates, and for off-season heating in temperate climates.



The fan installation at the back of the heater

THE PONTCHARTRAIN RAILROAD, one of the shortest lines in America, celebrated its one hundredth anniversary on January 20. The Pontchartrain railroad, like the Baltimore & Ohio whose charter was issued on February 28, 1827, still operates under the name which it was given when its original charter was issued. Eight trips daily are made by the railroad's one train, running between Pontchartrain Junction and Milneburg, a distance of 4.96 miles. Twelve trips on Sundays are made to and from Lake Pontchartrain by the train, which has come to be known as "Smoky Mary" and its engineer, conductor, flagman and fireman. The train crew members have entire charge of the movements of the single train, there being no trainmasters, dispatchers or signals, inasmuch as there is no danger of collision.

The J & L Tangent Die

A DIE in which the chasers are held tangent to the work rather than radial, has recently been added to the line of products manufactured by Jones & Lamson, Springfield, Vt. The chasers are designed so that the dull and worn portion on the ends of the chasers may be completely removed at a sacrifice of only a fraction of the length of the chasers. As the grinding is done on the ends of the chasers and not on the chamfer, machine adjustments for the length of thread do not have to be made when the chasers are changed.

The chasers have the thread profile ground at the correct helix angle for a given diameter and pitch, and are at the same time spaced relative to one another so that they track. The dovetail on the back of the chaser is also ground and ratchet teeth are cut on the tongue of the dovetail which engages a group of mating teeth in the chaser holder.

The chaser holder has a ground dovetail which receives the chaser supporting it directly behind the cutting edge. A plug in the chaser holder fits in a hole that is accurately located and ground. The teeth on the end of the plug engage the teeth on the back of the chaser and secure it accurately against lateral movement. The plug is secured in position by a screw which also operates the plug when the chaser is to be removed. The chasers are sharpened by removing from the end an amount equal to the pitch of the teeth on the back. They are then measured in a gage fitted with a graduated micrometer screw which tells exactly where the cutting edge will be when the chasers are in the die.

The dovetail on the chaser holder is ground to fit the ground dovetail in the body and, when assembled, the chaser just clears the front face of the body. The radial movement of the chaser holder is controlled by a cam ring, the lugs of which are ground concentric and true with its face. The cam ring is supported in four places by lugs on a locking ring which engage it directly behind the lugs which control the chaser holders. The locking ring is in turn supported by a collar and an adjusting nut.

The Jones & Lamson die in which the chasers are held tangent to the work

The collar supporting the locking ring is fitted with a key which locates and prevents the rotation of the operating sleeve. Four cam surfaces in the operating sleeve engage four mating surfaces on the locking ring. In operation the backward movement of the operating sleeve causes the locking ring to rotate slightly and release the cam ring which, being forced back by the springs, opens the die. The forward movement of the operating sleeve closes the die. The tool is designated as the J. & L. tangent die.

Drain Valves for Water Columns

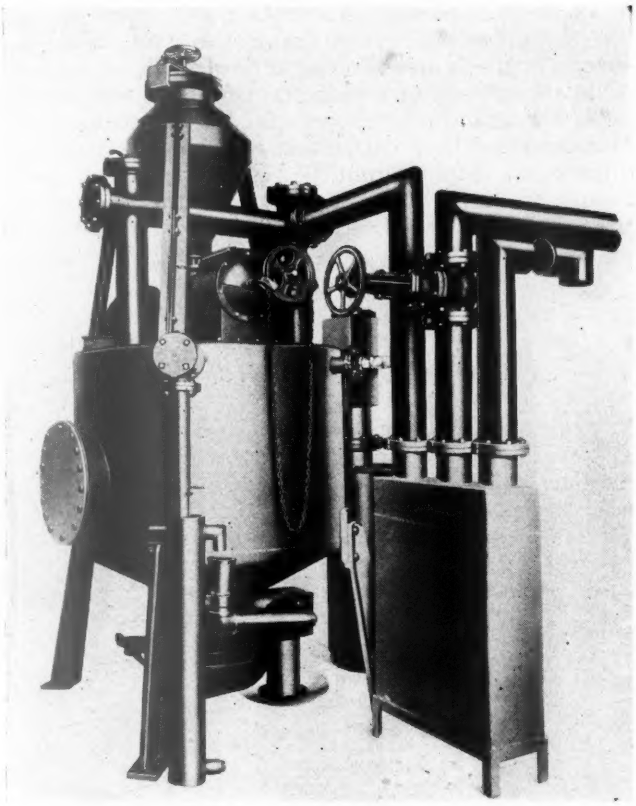
A DRAIN valve for use on locomotive water columns and gage glasses is a product recently brought out by the Ohio Injector Company, Wadsworth, Ohio. The valve is designed for working pressures up to 300 lb. The body and bonnet are of bronze of high tensile strength, while the stem is of manganese bronze and the removable seat ring and disc of O.I.C. high-nickel bronze. The latter is a special non-ferrous alloy, white in color, containing a high percentage of nickel, and was developed particularly to meet conditions found in locomotive service. It withstands the erosive action of grit or abrasives which may be carried by the steam or water passing through the valves. It retains its physical properties under the high temperatures encountered in 300-lb. steam service, and is also highly resistant to the chemical action of acid or other chemicals commonly found in manufacturing processes or in treated water.

The special form of seating surfaces used on the disc and seat ring was adopted as the result of a long series of tests on one of the principal railroads of the country where the water conditions are particularly bad and excessive amounts of scale were deposited on the seating surfaces. The drain valves are made in 3/8-in. and 3/4-in. sizes.

Drain valve for locomotive water columns and gage glasses

Oxweld Acetylene Generators

THE Oxweld Acetylene Company, 30 East Forty-Second street, New York, has placed on the market two improved types of non-automatic stationary acetylene generators for supplying large volumes of acetylene. These generators are each made in two sizes, having 500-lb. and 1000-lb. carbide capacity. They are designed for use where oxwelding and cutting are used extensively and where oxygen and acetylene are piped to stations convenient to operators.



The Oxweld type NA-3 acetylene generator

The Oxweld type NA-3 acetylene generator is for plants using low-pressure welding and cutting apparatus. It delivers gas to a storage holder which is regulated to supply acetylene to the shop piping system at a pressure of 20 in. water column. In operation, the carbide is conveyed from the hopper to the generating chamber by a rotary feed screw driven by a slow-speed reciprocating water motor. The screw, being cast nickel, is resistant to wear and will not cause sparks.

The gas enters the wash box from the generator where it passes through a water seal which acts as a scrubber. This removes any particles of residue which may be carried over. This device supplants the felt usually employed. It has the advantage that it cannot clog and cause abnormal back pressure or insufficient delivery to the holder, and thus insures a constant-generating pressure. When residue is being drawn off from the generator, the wash box acts as a vacuum release and permits a reverse flow of gas which allows acetylene to return from the holder to the generating chamber to displace the drained water. When the generator is refilled with water, the gas passes from the generating chamber to the holder through this same wash box. The wash box is provided with an overflow which automatically limits the water level to give proper depth to the seal, and to permit the functioning of the vacuum release during recharging.

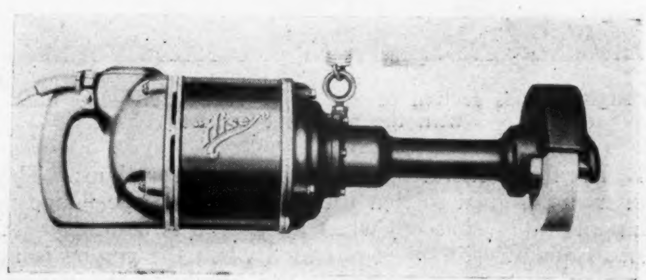
A gas holder of suitable size may be located either inside or outside the generator house as best meets the needs of a particular installation. An automatic water-holder shut-off is mounted on the holder which stops the carbide feed mechanism. When the gas bell approaches its upper limit, this shut-off must be opened by the attendant before the generator will again produce acetylene.

Except for this one automatic feature, all operations having to do with the starting and stopping of carbide feed must be performed by the generator attendant. For this reason the generator is classed as non-automatic; that is, the carbide feed is not automatically governed by, or interlocked with, the immediate acetylene requirements.

The type NA-4 generator is similar to the type NA-3, with the addition of an Ox-weld automatic booster system. It delivers acetylene to the shop piping system at pressures not to exceed the permissible limit of 15 lb. per sq. in. The booster system consists of a booster pump, a pressure-regulating by-pass valve, a pulsation tank, a mercury seal, a hydraulic back-pressure valve, an electric motor for driving the booster, and power transmission equipment. The booster unit may be had with a capacity suitable for the demands of any particular installation.

Hisey Portable Hand Grinders

TWO portable hand grinders which are made in 1-hp. and 2-hp. sizes for both direct and alternating current are products recently brought out by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The single-phase alternating current machines, which can be used for operation from lamp sockets, are equipped with commutating-type repulsion induction motors. The machines are designed to start and pick up speed under load within twice their rated capacity and are not objectionably affected by low voltage conditions.



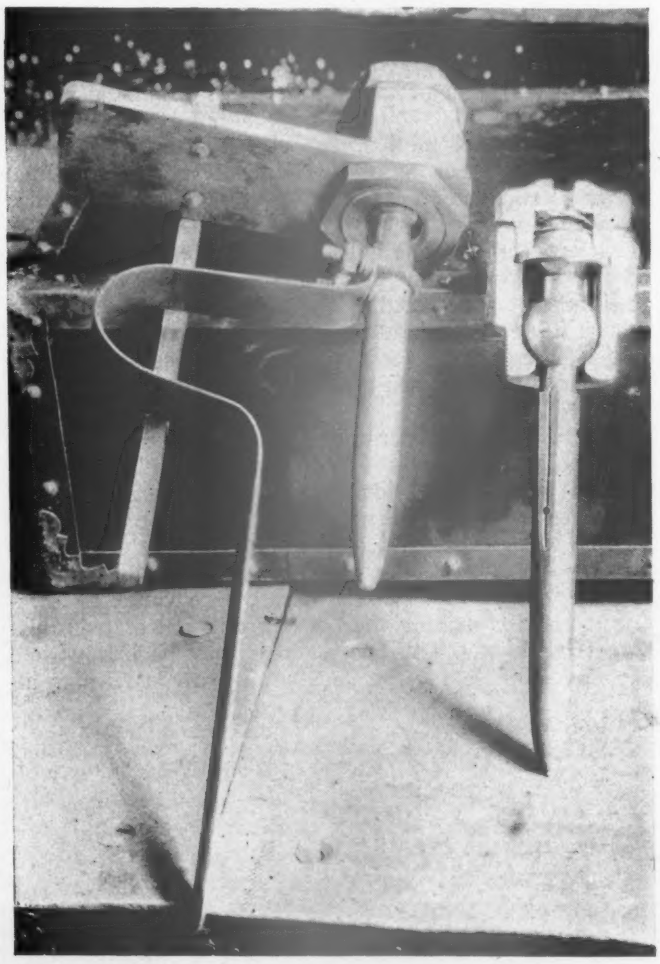
The Hisey portable grinder

The no-load speed of the 1-hp. a.c. and d.c. machine

is 3,400 r.p.m., while that of the 2-hp. a.c. machine is 1,800 r.p.m. and that of the 2-hp. d.c. machine, 2,200 r.p.m. The 1-hp. grinder is equipped with an 8-in. by 1½-in. wheel, while the wheel of the 2-hp. grinder is 1½-in. wide and 10 in. in diameter. The net weights, including an improved steel guard, of the 1-hp. and 2-hp. grinders are 90 lb. and 127 lb., respectively. The 1-hp. machine is 31 in. in overall length, while the 2-hp. machine is 32 in. long. Both sizes are 8⅝-in. in diameter. The length of the extension from the motor casing to the grinding wheel of each machine is 12 in. Standard equipment with both grinders include a grinding wheel, an adjustable steel wheel guard, a 10-ft. rubber cable, a connector plug and a suspension spring.

New Flange Oiler on the D. & R. G. W.

SEVERAL engines of the Denver & Rio Grande Western have been equipped with a new-type of automatic flange oiler, invented and patented by Harry B. Pfeiffer, general foreman of the Denver shops. The oiler is designed so that the flow of oil to the flange is automatically shut off when an engine is standing. A small quantity of oil is provided when the engine is in motion on straight track but the supply to the flanges is increased to the proper amount by the swing of the wheels as the locomotive rounds a curve. Provision is made for keeping the oil on the flange and off the wheel-tread.



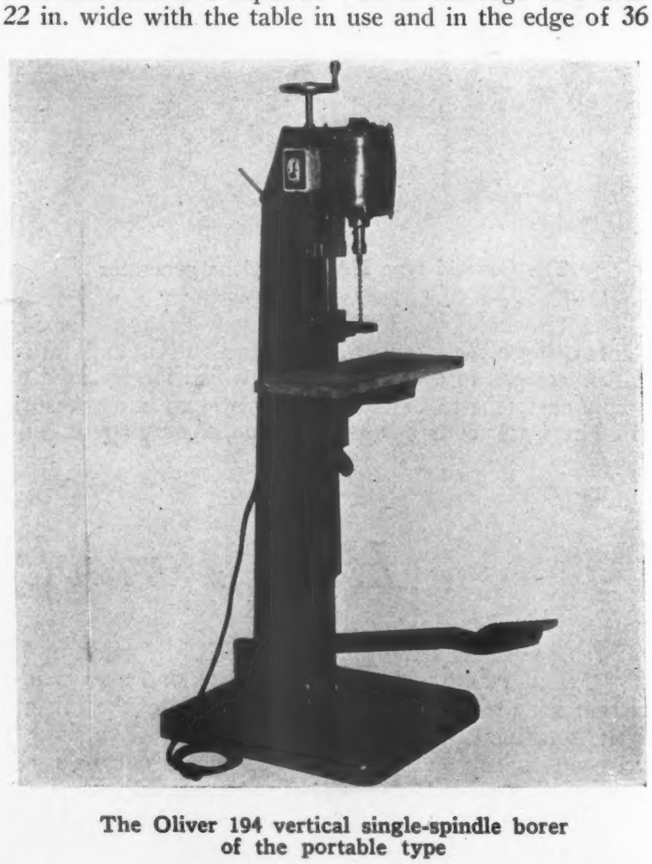
Right—Cross section of the flange oiler. Left—The oiler with the bracket complete

The oiler consists of a ¾-in. steel stem, 7-25/32 in. long, with the top slightly hollowed to guide the oil into a hole extending half way down the stem where it emerges on one side. A ball-shaped projection near the top of the stem holds it inside the brass body. The body is threaded at the bottom end for a 2½-in. brass lock nut which holds the oiler in its bracket. The top of the brass body is tapped to receive a brass cap bearing which is set on a bronze diaphragm with a ground valve seat. The valve is a round steel ball, contained in the brass cap. It is held rigidly in place by a light-steel coil spring when the engine is stationary on straight track. Any side motion of the flange is transmitted to the stem, raising the valve at one side and allowing a flow of oil corresponding to the amount of such motion. In rounding curves the inside flange oiler is prevented from swinging toward the tread by a flat section of spring steel clamped to the stem. Piping from the reservoir enters the oiler through the brass cap. Brackets for the oiler are of various sizes of flat steel designed to fit each type of engine.

A Single-Spindle Borer

A VERTICAL single-spindle borer of the portable type is a recent addition to the line of the Oliver Machinery Company, Grand Rapids, Mich. The machine, designated as the Oliver 194, is designed to bore ¾-holes in hard wood and 1½-in. holes in soft wood.

It will bore to a depth of 4 in. in the edge of boards 22 in. wide with the table in use and in the edge of 36 in. boards or doors without the table. It can also be used to bore to the center of pieces 8 in. wide.

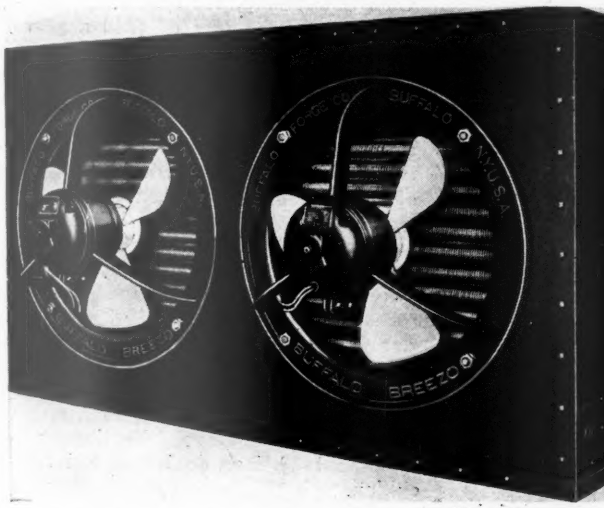


The Oliver 194 vertical single-spindle borer of the portable type

The borer is fitted with a plain wooden-top table having a vertical adjustment of 22 in. and is furnished with a ½-hp. vertical ball-bearing motor. The hold-down is adjustable to any desired position, being mounted on a saddle which runs on the ways of the column. Maximum fulcrum power for the operation of the machine is obtained by means of a treadle, spring and pull-rod arrangement. The machine when in use occupies 24 in. by 28 in. of floor space.

A Twin-Fan Unit Heater

A *RECENT* development of the Buffalo Forge Company, Buffalo, N. Y., is a heater which has been designated as the Buffalo 16-in. Twin Breezo-Fin unit heater. As suggested by its name, the heater has twin fans, each 16-in. in diameter and powered with an electric motor of 1/20, 1/10 or ⅛ hp. The heater



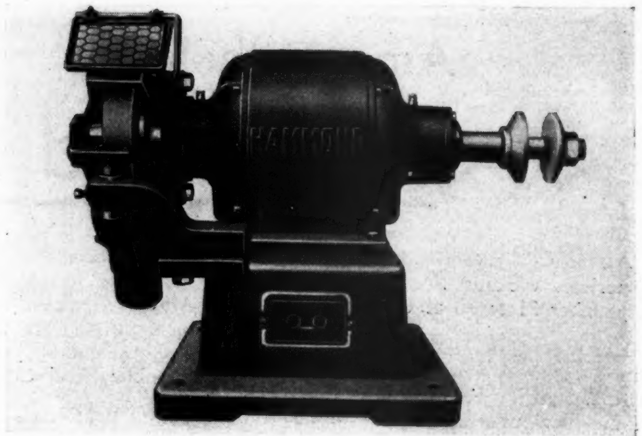
The 16-in. Twin Breezo-Fin unit heater

is 3 ft. 8½ in. long, 2 ft. 5 in. high and 10 in. deep, contains only one set of steam and drip connections, and is provided with the Aero-fin heating coil. This heater is said to have the lowest B.t.u. cost of the entire line of Buffalo unit heaters. It is quiet in operation and, when desired, one of the fans may be shut off, thus lowering the steam consumption and reducing the temperature.

The Hammond LW Grinder and Buffer

T*HE* Hammond Machinery Builders, Kalamazoo, Mich., have recently announced the Hammond LW combination grinder and buffer as an addition to its line of products. The machine which is made in 1½-hp. and 2-hp. sizes is designed as a general purpose tool. A grinding wheel can be mounted on one side with a buffing, polishing or wire-scratch wheel on the opposite end.

The motor used is especially designed for the service for which the machine is intended. It is capable of withstanding excessive overload and is built in accordance



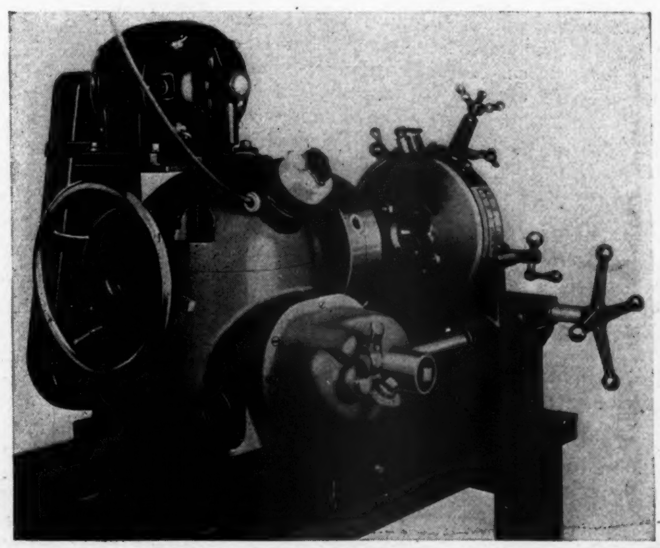
The Hammond LW grinder and buffer

with N. E. M. A. recommendations. The 1½-hp. and larger machines are equipped with push-button control and a Cutler-Hammer automatic motor starter, which protects the motor from overload, low voltage and phase failure. The machines are furnished for alternating currents of 110, 220, 440 and 550 volts, 25 to 60 cycle. 1, 2 or 3 phase and for 110- and 220-volt direct current.

A Bench-Type Threader

T*HE* Oster Manufacturing Company and the Williams Tool Corp., Cleveland, Ohio, is now equipping all Willie Williams portable power threaders with Domestic electric universal motors. This motor speeds up the production of the machine and eliminates any tendency toward stalling because the speed of the motor is in direct proportion to the pull on the dies.

The threader is equipped with built-in cutting off, reaming and chamfering tools, a built-in quick open-



The Oster bench-type threader

ing die head that eliminates backing off, a geared oil pump and two powerful chucks, one a heavy gripping chuck and the other a self-centering universal chuck. The threader can be furnished in either the bench type or pedestal type and either will thread, cut, ream and chamfer all sizes of pipe from ¼ in. to 2 in.

Among the Clubs and Associations

American Welding Society. — The American Welding Society will meet on September 21 to 26 at Chicago, Ill.

Railway Car Men's Club of Peoria and Pekin.—A general discussion of the A.R.A. Loading Rules will be the feature of the September 22 meeting of the Railway Car Men's Club of Peoria & Pekin which will be held at 7 p.m. at the Union Depot, Peoria, Ill.

New York Railroad Club.—Robert E. Woodruff, operating vice-president of the Erie, will present a paper entitled "Our Experiences in Saving Coal" before the meeting of the New York Railroad Club which will be held on September 19 at the Engineering Societies building, 29 West Thirty-ninth Street, New York.

Louisiana Car Department Association.—H. H. Burns of the Westinghouse Air Brake Company will present a paper on air brakes before the meeting of the Louisiana Car Department Association which will be held at 7:45 p.m. on September 18 at the Hotel Monteleone, New Orleans, La.

National Exposition of Power and Mechanical Engineering. — The ninth National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York, from December 1 to 6. The exposition is under the leadership of I. E. Moultrop, chairman.

Railway Club of Greenville.—At 6:15 p.m. on September 16 at the Zion Reformed Church, E. S. Fitzsimmons, sales manager, Flannery Bolt Company, will address the Railway Club of Greenville with a paper on the Inspection of Locomotive Boiler Flexible Staybolts. Moving pictures will be used to illustrate the subject.

St. Louis Railway Club.—The Hon. Henry S. Caulfield, governor of the State of Missouri, will address the St. Louis Railway Club on Friday evening, September 12, at 8 p. m. at the Statler Hotel, St. Louis, Mo. Milton R. Stahl, chairman of the Public Service Commission, will also be one of the guests.

Cincinnati Railway Club.—The Cincinnati Railway Club will meet at dinner on September 9 at 6 p.m. at the Chamber of Commerce, Cincinnati, Ohio. Music and other entertainment will be provided and an address on the Historic Holy Lands will be presented by John B. Kenna, manager, Northwestern National Life Insurance Company, Cincinnati.

Southern and Southwestern Railway Club.—Robert Scott, director of insurance and safety of the Atlantic Coast Line at Wilmington, N. C., will present a paper on the prevention of personal injuries at the meeting of the Southern and Southwestern Railway Club which will be held at 10 a.m. on September 18 at the Ansley Hotel, Atlanta, Ga. A motion picture entitled "Making It Tough" also will be presented by a representative of the Republic Steel Company.

Car Foremen's Assn. of Chicago.—William J. Owen, chief interchange inspector at Peoria, Ill., will present a paper on the Interchange of Freight Equipment, covering the inspection of cars and the issuance of defect cards, before the meeting of the Car Foremen's Association of Chicago which will be held on September 8 at 8 p. m. at the Great Northern Hotel, Chicago.

Car Foreman's Association of Omaha, Council Bluffs and South Omaha Interchange.—Changes in the A. R. A. rules will be discussed by H. E. Moran, general car foreman of the Chicago Great Western, before the September 11 meeting of the Car Foreman's Association of Omaha which will be held at 2 p. m. in the office of the general car foreman of the Union Pacific at Council Bluffs, Iowa.

Central Railway Club of Buffalo.—September 11 has been designated as ladies night for the Central Railway Club of Buffalo. The gathering will be at 8 p. m. in the ballroom of the Statler Hotel, Buffalo, N. Y., where a buffet luncheon will be served. Dancing and entertainment will follow, the entertainment being under the direction of Dr. Phillips Thomas of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., who will demonstrate Rastus Robot from the first "electrical flea" circus. The fleas for the presentation will be electrons, an electron being described by Dr. Thomas as the flea on the back of the atom which until recently had been the mightiest and smallest substance known.

National Safety Council.—The nineteenth annual Safety Congress and Exposition will be held at Pittsburgh, Pa., September 29 to October 3, inclusive. The Steam Railroad Section will meet on September 30, October 1 and October 2. Papers of particular interest to stores and mechanical officers will be presented on Accident Prevention in the Stores Department, by J. P. Kavanaugh, general storekeeper, Chesapeake & Ohio; How Can We Reduce Accidents to Employees Due to Being Struck and Run Over by Cars and Locomotives?, by George H. Warfel, assistant to general manager, Union Pacific; Overcoming the Hazards of Operating Hand Brakes, by G. H. Hammond, assistant general safety agent, New York Central Lines; Accidents When Coupling and Uncoupling Cars and Locomotives, by C. L. LaFountaine, general safety supervisor, Great Northern; Collapse and Fall of Objects in Shops, by F. R. Bradford, superintendent of safety, Boston & Maine, and Shop Burns and Falls, by G. N. Kramerer, shop safety agent, Bessemer & Lake Erie.

The St. Louis Railway Club announces that it will choose again this year a son of one of its members who will be the beneficiary of the club's scholarship at Washington University, St. Louis. In addition to the benefit of a free scholarship in the Department of Arts and Science, Washington University known as the St. Louis Railway Club scholarship, the beneficiary will be paid directly the sum of $250 a year in four equal sums. E. H. Harman, Jr., who has held the club scholarship for the past four years, was graduated last June with a bachelor of arts degree in arts and science. The club's contribution for furthering the education of sons of its members is one of long standing, seven sons of members having been awarded the four-year scholarship. The members whose sons received the awards were representatives of the following railroads and companies: 1902, St. Louis Car Company; 1906, Baltimore & Ohio; 1910, Missouri Pacific; 1914, Union Refrigerator Transit Company; 1918, Terminal Railroad Association; 1912, no student; 1926, Chicago, Burlington & Quincy; 1930, Terminal Railroad Association.

The Purchases and Stores Division of the A. R. A. has announced through Secretary W. J. Farrell, a competition for papers on purchasing and stores activities. The contest will be conducted in the same manner as in previous years and is open to all employees of railway purchases and stores departments below the ranks of assistant purchasing agent and assistant general storekeeper. The papers may consider any subject relating to the purchasing, storing or distributing of material, and should contain between 1,000 and 3,000 words. They must be submitted not later than March 1, 1931. The papers will be judged on the basis of 50 per cent for originality of subject, ideas, conclusions and solutions of problems; 25 per cent for general interest and importance of the subject; 20 per cent for conciseness and clearness of expression, including grammatical construction; and 5 per cent for general appearance and neatness. Four typewritten copies of each paper are required, which should be typed in double space on one side of the paper, using a black record ribbon, and should carry, on the first page, the subject of the paper, full name of the author, and his title, railroad and address. Two papers will be selected from the entries by a committee consisting of L. P. Krampf, supply agent, Missouri Pacific; J. E.

Mahaney, general supervisor of stores, Chesapeake & Ohio; and E. F. Hasbrook, assistant purchasing agent, Chicago, Burlington & Quincy. The authors of these two papers will be invited to the annual convention of the association to present their papers. The papers are to be mailed to W. J. Farrell, secretary, Division VI, Purchases and Stores, American Railway Association, 30 Vesey street, New York.

Club Papers

Lubrication of Cars and Locomotives

Cleveland Railway Club—Meeting held at Hotel Hollenden, Monday, June 2, 1930. The June meeting of the Cleveland Railway Club was featured by a presentation of a paper, "Safety from the Viewpoint of the Rolling Stock Department," by J. J. Schneider, safety agent of the Cleveland, Cincinnati, Chicago & St. Louis. The paper dealt exclusively with the means and methods for the prevention of accidents. Leadership, teamwork, and successful organization are the essential factors in accident prevention, Mr. Schneider stated. It was pointed out that of these three, successful organization was probably the foremost. To attain it Mr. Schneider stated, that, first, it is necessary to create a safe atmosphere by emphasizing cleanliness, by obtaining good lighting, by the proper guarding of machinery and by the removal of hazards. Second, by the proper education of employees in the safe manner of performing work, emphasizing the consequences of unsafe practices. Third, a thorough investigation of all accidents and an analysis of all contributary factors for a possible elimination of them to prevent a recurrence of the same or similar accidents.

In conclusion Mr. Schneider presented an analysis of accidents occurring from handling objects, falling objects, falls, hand tools, goggles and clothing, etc.

A.R.A. Loading Rules

Railway Carmen's Club of Peoria and Pekin—Meetings held in Room 38 of the Union Station at Peoria, Ill. on June 17, and July 18, 1930.

The July meeting of the Railway Carmen's Club of Peoria and Pekin was featured by the presentation of a paper and a motion picture on the lubrication of cars and locomotives. This presentation was in charge of G. W. Kester of Kansas City, Mo., who represented the Sinclair Oil Company. Pointing to the progress made in locomotive and car design during the past few years, Mr. Kester discussed at length the efforts made by the railroads and oil companies to improve the operating efficiency of power and rolling stock by the introduction of oils of proper grade and quality.

The meeting concluded with the showing of motion pictures, the object of which was to emphasize the necessity and the correct method of lubricating car and locomotive journals.

Directory

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of mechanical associations and railroad clubs:

Air-Brake Association.—T. L. Burton, Room 5605 Grand Central Terminal building, New York.

American Railway Association.—Division V.—Mechanical.—V. R. Hawthorne, 59 East Van Buren street, Chicago.

Division V.—Equipment Painting Section.—V. R. Hawthorne, Chicago. Next meeting, Sept. 9-11, 1930. Congress Hotel, Chicago.

Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey street, New York.

Division I. — Safety Section. — J. C. Caviston, 30 Vesey street, New York.

Division VIII.—Car Service Division.—C. A. Buch, Seventeenth and H streets, Washington, D. C.

American Railway Tool Foremen's Association.—G. G. Macina, 11402 Calumet avenue, Chicago. Next meeting, September 10, 11 and 12, Hotel Sherman, Chicago.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. Thirty-ninth street, New York.

Railroad Division.—Paul D. Mallay, chief engineer, transportation department, Johns-Manville Corporation, 292 Madison avenue, New York.

Machine Shop Practice Division.—Carlos de Zafra, care of A. S. M. E., 29 West Thirty-ninth street, New York.

Materials Handling Division.—M. W. Potts, Alvey-Ferguson Company, 1440 Broadway, New York.

Oil and Gas Power Division.—L. H. Morrison, associate editor, Power, 475 Tenth avenue, New York.

Fuels Division.—A. D. Black, associate editor, Power, 475 Tenth avenue, New York.

American Society for Steel Treating.—W. H. Eiseman, 7016 Euclid avenue, Cleveland, Ohio.

American Society for Testing Materials.—C. L. Warwick, 1315 Spruce street, Philadelphia, Pa.

American Welding Society.—Miss M. M. Kelly, 29 West Thirty-ninth street, New York.

Association of Railway Electrical Engineers.—Joseph A. Andrucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago, Ill.

Association of Railway Supply Men.—J. W. Fogg, MacLean-Fogg Lock Nut Company, 2649 N. Kildar avenue, Chicago. Meets with International Railway General Foremen's Association.

Boiler Maker's Supply Men's Association.—Frank C. Hasse, Oxweld Railroad Service Company, 230 N. Michigan avenue, Chicago. Meets with Master Boiler Makers' Association.

Canadian Railway Club.—C. R. Crook, 129 Charon street, Montreal, Que. Regular meetings, second Thursday of each month at June, July and August, at Windsor Hotel, Montreal, Que.

Car Foremen's Association of Chicago.—G. K. Oliver, 3001 West Thirty-ninth Place, Chicago, Ill. Regular meeting, second Monday in each month, except June, July and August. Great Northern Hotel, Chicago, Ill.

Car Foremen's Club of Los Angeles.—J. W. Krause, 608 South Main street, Los Angeles, Cal. Meetings second Monday of each month except July, August and September, in the Pacific Electric Club building, Los Angeles, Cal.

Car Foreman's Association of Omaha, Council Bluffs and South Omaha Interchange.—Geo. Kriegler, car foreman, Chicago, Burlington & Quincy, Sixteenth avenue and Sixth streets, Council Bluffs, Iowa. Regular meetings, second Thursday of each month at Council Bluffs.

Car Foremen's Association of St. Louis.—F. G. Weigman, 720 North Twenty-third street, East St. Louis, Ill. Regular meeting first Tuesday in each month, except July and August, at American Hotel Annex, St. Louis, Mo.

Central Railway Club of Buffalo.—T. J. O'Donnell, 1004 Prudential building, Buffalo, N. Y. Regular meeting, second Thursday each month, except June, July and August, at Hotel Statler, Buffalo.

Cincinnati Railway Club.—D. R. Boyd, 453 East Sixth Street, Cincinnati. Regular meeting second Tuesday, February, May, September and November.

Cleveland Railway Club.—F. L. Frericks, 14416 Adler avenue, Cleveland, Ohio. Meeting first Monday each month, except July, August and September, at Hotel Hollanden, East Sixth and Superior avenue.

Eastern Car Foremen's Association.—E. L. Brown, care of the Baltimore & Ohio, Staten Island, N. Y. Regular meetings fourth Friday of each month, except June, July, August and September.

International Railroad Master Blacksmith's Association.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich. Next meeting, September 23-25, 1930, Hotel Sherman, Chicago.

International Railroad Master Blacksmiths' Supply Men's Association.—J. H. Jones, Crucible Steel Company of America, 650 Washington boulevard, Chicago.

International Railway Fuel Association.—C. T. Winkless, Room 707, LaSalle Street Station, Chicago. Next meeting May 5-8, 1931, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—William Hall, 1061 W. Wabasha street, Winona, Minn. Next meeting, September 16 to 19, inclusive, Hotel Sherman, Chicago.

International Railway Supply Men's Association.—W. J. Dickinson, acting secretary, 1703 Fisher building, Chicago. Meets with International Railway Fuel Association.

Louisiana Car Department Association.—L. Brownlee, 3730 South Prieur street, New Orleans, La. Meetings third Thursday in each month.

Master Boilermaker's Association. — A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y.

Master Car Builders' and Supervisors' Association.—A. S. Sternberg, master car builder, Belt Railway of Chicago.

National Safety Council—Steam Railroad Section: W. A. Booth, Canadian National, Montreal, Que. Annual congress, September 29-October 4, William Penn and Fort Pitt Hotels, Pittsburgh, Pa.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic avenue, Boston, Mass. Regular meeting second Tuesday in each month, excepting June, July, August and September. Copley-Plaza Hotel, Boston.

New York Railroad Club.—Meetings third Friday in each month, except June, July and August, at 29 West Thirty-ninth street, New York. Douglas I. McKay, executive secretary, 26 Cortlandt street, New York.

Pacific Railway Club.—W. S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month in San Francisco and Oakland, Cal., alternately.

Pueblo Car Men's Association.—I. F. Wharton, chief clerk, Interchange Bureau, Pueblo, Colo.

Railway Business Association. — Frank W. Noxon, 1124 Woodward building, Washington, D. C.

Railway Car Men's Club of Peoria and Pekin.—C. L. Roberts, chief clerk, Peoria & Pekin Union Railway, 217 Lydia avenue, Peoria, Ill.

Railway Club of Greenville.—Paul A. Minnis, Bessemer & Lake Erie, Greenville, Pa. Meetings third Tuesday of each month, except June, July and August.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview avenue, Pittsburgh, Pa. Regular meeting fourth Thursday in month, except June, July and August. Ft. Pitt Hotel, Pittsburgh, Pa.

Railway Equipment Manufacturers' Association.—F. W. Venton, Crane Company, 836 South Michigan avenue, Chicago. Meets with Traveling Engineers' Association.

Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio, Baltimore, Md Next meeting, October 21-23.

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

St. Louis Railway Club.—B. W. Frauenthal, M. P. O. Drawer 24, St. Louis, Mo. Regular meetings, second Friday in each month, except June, July and August.

Southern and Southwestern Railway Club.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings third Thursday in January, March, May, June, September and November. Annual meeting third Thursday in November, Ansley Hotel, Atlanta, Ga.

Supply Men's Association.—E. H. Hancock, treasurer, Louisville Varnish Company, Louisville, Ky. Meets with Equipment Painting Section, Mechanical Division, American Railway Association.

Supply Men's Association.—Bradley S. Johnson, W. H. Miner, Inc., Chicago. Meets with Master Car Builders and Supervisors' Association.

Traveling Engineers' Association. — W. O. Thompson, 1177 East Ninety-eighth street, Cleveland, Ohio. Next meeting September 23-26, 1930, Hotel Sherman, Chicago.

Western Railway Club.—W. J. Dickinson, 343 South Dearborn street, Chicago. Regular meetings, third Monday in each month, except June, July and August.

NEWS

THE BALTIMORE & OHIO has awarded the Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa., a contract for the construction of a water-treating plant at Jacksonburg, W. Va.

THE ERIE has awarded a contract to the Roberts & Schaefer Company, Chicago, for the furnishing and erecting of a combined N. & W. type engine coaler and cinder handling plant and a sanding plant at Akron, Ohio.

THE PERE MARQUETTE has awarded a contract to the Roberts & Schaefer Company, Chicago, for the designing and erecting of a 300-ton capacity reinforced concrete three-track shallow-pit locomotive coaling plant at New Buffalo, Mich.

THE NORTHERN PACIFIC has awarded a contract for the construction of an extension to the enginehouse at Duluth, Minn., to George H. Lounsbury & Son, Duluth, at a cost of about $42,000. A contract has been let to the Carl J. Steen Company, Grand Forks, N. D., for the construction of a machine shop at Glendive, Mont., at a cost of $30,000.

THE UNION PACIFIC plans the construction of a new freight classification yard with accompanying facilities at Cheyenne, Wyo. This yard, which will be constructed south of the present shop grounds, will consist of 36 miles of track, including new westbound and eastbound train yards and new car-repair facilities. These will be made up of 18 train yard tracks having a capacity of 140 cars each, four car-repair tracks, each about 2,000 ft. long, and a number of caboose tracks. A contract for the construction of an electric cinder plant at Hastings, Neb., has been let to the Roberts & Schaefer Company, Chicago.

Wage Statistics for May

THE NUMBER of employees reported to the Interstate Commerce Commission by Class I railways as of the middle of May was 1,601,485, and the total compensation was $229,628,656. Compared with returns for the corresponding month of last year the summary for May, 1930, shows a decrease of 112,904 in the total number of employees, or 6.59 per cent. The total compensation shows a decrease of $21,116,668, or 8.42 per cent.

Analysis of Wage Changes

Hourly earnings of all wage earners on Class I railroads in the United States averaged slightly over 64 cents in the fourth quarter of 1929 while average weekly earnings were $31.80, according to a study entitled "Wages in the United States 1914-1929" recently completed by the National Industrial Conference Board, New York.

Number of Railway Employees Greatly Reduced

A HEAVY REDUCTION in the number of railway employees took place between May 15 and June 15, according to the preliminary statement of employment on Class I steam railways issued by the Interstate Commerce Commission. The number of employees as of the middle of June was 1,564,269, a decrease of approximately 156,000 or 9.9 per cent as compared with the number on June 15, 1929, and 9.88 per cent as compared with June 15, 1928. At the middle of May the number was 1,601,485, a decrease of 6.59 per cent as compared with the preceding months. of last year. The further decrease of 37,216 in May and June follows three months in which the monthly figures had shown increases as compared with the preceding months. The maintenance of equipment and stores group showed a decrease of 9.72 per cent.

As compared with the number of employees in service in October, 1929, the number in June represents a reduction of approximately 185,000, some of which represents seasonal reduction. During the winter the railways, observing President Hoover's request, attempted to keep up their employment as much as possible and the reduction in numbers reported from month to month showed only slightly more than the usual seasonal reductions, but as the decrease in the volume of business continued the percentage of decrease as compared with the corresponding months of last year began to grow larger. For January the reduction was 2.11 per cent, for February 3.86, for March 4.97, and for April, 5.59.

According to the Conference Board study, average earnings per hour of all train and engine service labor amounted to 92 cents, and weekly earnings, to $48.13; skilled shop labor received slightly less than 80 cents per hour and $37.62 per week. Earnings of unskilled shop labor were nearly 38 cents per hour and $17.97 per week.

"With reference to the trend of earnings since 1914-1915," states the Conference Board report, "It will be noted that average hourly earnings reached their maximum in 1920, when they were 159 per cent above 1914-1915. In 1921 they declined slightly, and in the following year, more markedly. Since 1923 there has been an upward movement accompanied by fluctuations, so that by 1929 earnings were again close to the 1920 level. In the last quarter of 1929 average hourly earnings were 154 per cent above 1914-1915. The development of average weekly earnings has been similar to that of average hourly earnings, except that the maximum earnings in 1920 were only 125 per cent higher than in 1914-1915; after 1920 the reduction was somewhat more gradual than in the case of hourly earnings, and the subsequent low point was not reached until 1924. In the last quarter of 1929, average weekly earnings were 110 per cent above 1914-1915 and, therefore, not quite so close to the 1920 level as hourly earnings.

"Of the three groups, all train and engine service labor, skilled shop labor, and unskilled labor, the last mentioned showed the largest relative increases up to 1920. At that time the average earnings of unskilled labor per hour were 193 per cent, and per week, 151 per cent above 1914-1915. The advances in the earnings of the skilled shop labor group followed fairly closely with increases of 176 per cent and 143 per cent respectively, above 1914-1915, while the earnings of train and engine service labor had risen 102 per cent and 90 per cent respectively. By the end of 1929, however, the earnings of skilled shop labor had advanced relatively higher over the 1914-1915 level than those of any other group; per hour they were 168 per cent, and per week, 123 per cent above 1914-1915, while those of unskilled labor had risen 135 per cent and

91 per cent, respectively, and those of all train and engine service labor, 115 per cent and 89 per cent respectively."

Taking into account changes in the cost of living, in order to arrive at the "real earnings" of railroad workers, the Conference Board finds that "the real average hourly earnings of railroad workers have been above the 1914-1915 level at every subsequent period for which figures have been computed except in 1916 and 1917, when they were 2 per cent and 7 per cent, respectively, below that level. The maximum in real average hourly earnings was not reached in 1920, as might be expected, but in the first two quarters of 1929, when they were 58 per cent above the 1914-1915 level. In 1920 they were 32 per cent above 1914-1915. A similar picture is presented by the figures of real average weekly earnings, although the relative increases over 1914-1915 are not so large. The maximum, 33 per cent, was attained in the second quarter of 1929. The increase amounted only to 14 per cent in 1920, but rose to 25 per cent in 1922. The relatively advantageous position in 1929 was attributable both to an increase in actual money earnings and to a slight decline in the cost of living."

Concerning hours of work, the report states that between 1914 and 1918 the average number of hours of all wage earners in the railroad industry was 60 a week. Since 1918 they have been fluctuating around 50 a week.

Domestic Orders Reported During August, 1930

Locomotives

Name of Company	No. Locos. ordered	Type	Builder
Lehigh Valley	1	4-8-4	American Locomotive Co.
Illinois Steel Co.	4	0-4-0	American Locomotive Co.
Lehigh Valley	1	4-8-4	Baldwin Locomotive Works.
Chicago Great Western	15	2-10-4	Baldwin Locomotive Works.
Pickands Mather & Co.	1	Switching	American Locomotive Co.
Pennsylvania	12	Electric	Company Shops
Total for month	34		

Freight Cars

Name of Company	No. cars ordered	Type	Builder
Inter-State Iron Co.	42	Dump	Koppel Industrial Car & Equipment Co.
Great Northern	100	Hopper	Canton Car Company
U. S. Navy Dept., Bureau of Supplies and Accounts	1	Box	American Car & Foundry Company
Elgin, Joliet & Eastern	300	Flat	Company Shops
	250	Gondola	
Haley, Chisholm & Morris	20	Dump	Koppel Industrial Car & Equipment Co.
Illinois Steel Company	5	Flat	American Car & Foundry Company
	95	Ingot	American Car & Foundry Company
Illinois Steel Company	10	Ingot	
Total for the month of August	823		

Passenger Cars

Name of Company	No. cars ordered	Type	Builder
Boston & Main	4	Coaches	Osgood Bradley Car Company
	2	Baggage and Passenger	
Main Central	5	Coaches	Osgood Bradley Car Company
	2	Baggage and Smoking	
Total for the month of August	13		

Modern Fashions in the Cab

Shouting across the cab of a modern locomotive when traveling at 60 or 70 miles an hour, is not a particularly pleasant proceeding, even to men experienced in the practice, and E. S. McMillan, engineman on the Canadian National, instead of calling signals by word of mouth, makes a motion instead. Observing a clear signal he holds his left arm upright; and the fireman, having sighted the signal, replies with the same gesture. For caution the arm would be held at an angle of 45 degrees from vertical; and for stop it would be held horizontally.

This we learn from an article by L. B. N. Gnaedinger, writing in *World's Work*. Mr. Gnaedinger took a ride with Engineman McMillan on the International Limited, which regularly makes the 126 miles from Montreal to Brockville in 120 minutes.

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All-metal lift truck platforms save labor in handling machine parts in the Little Rock and Sedalia locomotive shops of the Missouri Pacific

Supply Trade Notes

A. E. Biddle, vice-president in charge of sales of the Union Railway Equipment Company, Chicago, has resigned.

James K. Cullen, president of the Niles Tool Works Company, Hamilton, Ohio, died at Hot Springs, Va., on Thursday, July 31.

James C. Davis, advisory operating vice-president of the American Steel Foundries, Chicago, died, at Mackinac Island, Mich., on August 10.

Theodore Tomlinson Kennedy has been appointed district manager of the Los Angeles, Cal., office of the Okonite Company, Passaic, N. J.

David W. Van Alstyne, for many years associated with the American Locomotive Company in various capacities and for the past few years assistant to vice-president of sales at New York, has resigned.

The Link-Belt Company, Pacific division, has moved into its new manufacturing plant and office located at Paul avenue, near Bayshore Highway, San Francisco, Calif.

C. T. Connelly, representative of the Independent Pneumatic Tool Company, with headquarters at Detroit, Mich., has been appointed manager of the Buffalo, N. Y., office.

The Presto-O-Lite Company, Inc., New York, has opened a new plant for the manufacture and distribution of dissolved acetylene at 648 Bryan Stock Trail, Casper, Wyo.

The Leavitt Machine Company, Orange, Mass., has appointed Charles C. Phelps, 11 Park Place, New York, as its sales agent for metropolitan New York and northern New Jersey.

The Inland Steel Company has completed at its Indiana Harbor Works a new merchant bar mill which is equipped to produce the smaller sizes of rounds, flats, squares and shapes, as well as bands down to No. 12 gage and coiled material.

The National Battery Company, St. Paul, Minn., has purchased The Gould Storage Battery Company, New York. The Gould Company is one of the oldest manufacturers in the car lighting field. The National now has 22 branches and factories in the United States.

A. F. Murphy has been appointed works manager of the Zanesville division of the American Rolling Mill Company, at Zanesville, Ohio. Heretofore Zanesville has been a part of the Middletown division, but in future it will be operated as a separate unit. Mr. Murphy was first employed as a laborer in the Zanesville plant in 1906. He worked in numerous other positions in the plant until 1910, when he was made superintendent of the plant and on January 1, 1922, he was appointed plant manager at Zanesville. L. F. Reinartz, assistant general superintendent since 1923, has been appointed works manager of the Middletown division in charge of operations at East Works and Central Works at Middletown, Ohio. Mr. Reinartz joined the company in July, 1909, as a chemist in the open hearth department. Later he served successively in various positions until February, 1923, when he was made assistant general superintendent of the Armco plant at Middletown. G. D. Tranter, open hearth superintendent, has been appointed to the new position of general superintendent which has been created for the Middletown division and S. E. Graeff has been appointed assistant general superintendent at Middletown. Mr. Tranter became a member of the Armco organization in September, 1911, as weighmaster in the open hearth department and on October 1, 1923, he was appointed open hearth superintendent.

E. H. Weigman, master car builder of the Kansas City Southern at Pittsburg, Kan., has resigned to become assistant to vice-president of the Grip Nut Company, Chicago, with jurisdiction over all territory west of Chicago. Mr. Weigman was born on July 29, 1892, at DeSoto, Mo. He began his railroad career in 1909 as a car repairer on the Louisville & Nashville at East St. Louis, Ill., and was employed in various capacities in the car department of the Terminal Railroad Association of St. Louis, the Missouri Pacific Lines, the Great Northern, and the Northern Pacific. In April, 1913, he became traveling representative of the car department of the Atlantic Coast Lines, with headquarters at Wilmington, N. C.; in February, 1917, assistant secretary of the Master Car Builders' and Master Mechanics' Associations (now the Mechanical Division, American Railway Association), with headquarters at Chicago; on August 1, 1917, supervisor of car repairs of the Louisville & Nashville, at Louisville, Ky., and on October 1, 1925, master car builder of the Kansas City Southern at Pittsburg.

E. H. Weigman

C. B. Woodworth, who has been appointed manager of the railroad division of the Vanadium Corporation of America, with headquarters at Chicago, was graduated in mechanical engineering from Purdue University in 1907. From that time until 1916 he served with the mechanical departments of the Wabash and the Baltimore & Ohio, passing through various grades from machinist to general foreman at the Mt. Clare shops of the Baltimore & Ohio. He then entered the employ of the American Arch Company where he remained until 1918 when he received a commission as captain of engineers in the United States Army. Upon his return to this country after his service of 15 months with the A. E. F. on railroad work in France, he joined the foreign sales department of the American Locomotive Company and for six years was in the Argentine and in Brazil engaged in sales and service work. In 1926, he went with the Premier Staybolt Company as special technical representative and in May, 1927, left that service and was appointed manager of the western division of the Vanadium Corporation of America, with headquarters at Chicago.

C. B. Woodworth

Byron O. Brill, general purchasing agent of the J. G. Brill Company, died suddenly in the Presbyterian hospital at Philadelphia, Pa., on July 21, after a short illness.

The Curtin-Howe Corporation, New York, has moved its Chicago office from 410 North Michigan avenue to 20 North Wacker drive. It has also established an office in the Security building, Minneapolis, Minn., which has been placed in charge of D. R. Manuel, of the Spokane, Wash., office, who has been appointed northwestern manager.

Victor W. Peterson has been elected president and general manager of the Shafer Bearing Corporation, Chicago. He is also president of the Hannifin Manufacturing Company and the Sherman-Manson Manufacturing Company. He succeeds Julius E. Shafer who has been elected vice-president in charge of engineering. This company is extending its facilities by enlarging its research laboratory and engineering department.

Personal Mention

General

WILLIAM J. KNOX, mechanical engineer of the Buffalo, Rochester & Pittsburgh at Du Bois, Pa., has retired.

WILLIAM L. KINSELL has been appointed superintendent of motive power and equipment of the Alaska Railroad, with headquarters at Anchorage, Alaska. Mr. Kinsell was graduated from the University of Minnesota in 1900, in electrical engineering, and for a number of years was connected with the mechanical departments of railroads in the northwest.

Master Mechanics and Road Foremen

G. E. LUND, master mechanic at Marion, Ohio, has been appointed to a similar position at Meadville, Pa.

E. POOL, master mechanic of the Erie at Port Jervis, N. Y., has been transferred, in the same capacity, to Marion, Ohio.

GEORGE THIBAUT, district master mechanic of the Erie at Secaucus, N. J., has been transferred to the position of master mechanic at Port Jervis, N. Y.

H. E. GREEN has been appointed road foreman of the St. Paul division of the Northern Pacific at St. Paul, Minn., succeeding C. C. Anders.

C. C. ANDERS, road foreman of the St. Paul division of the Northern Pacific at St. Paul, Minn., has been transferred to the Seattle division, with headquarters at Auburn, Wash.

W. E. HARMISON, master mechanic of the Erie, at Meadville, Pa., has been promoted to the position of district master mechanic, New York district, with headquarters at Secaucus, N. J., succeeding G. Thibaut.

Car Department

J. R. SCOTT, general traveling air brake instructor of the St. Louis-San Francisco, has retired.

N. N. CUNNINGHAM has been promoted to the position of paint foreman of the Chesapeake & Ohio, with headquarters at Russell, Ky.

FRANK ELLIS, road foreman of engines of the St. Louis-San Francisco, has been appointed general traveling air brake instructor, succeeding J. R. Scott.

C. A. COLEMAN, paint foreman of the Chesapeake & Ohio at Russell, Ky., has been transferred to Charlottesville, Va., as car foreman.

Shops and Enginehouse

S. V. MUDGE, night enginehouse foreforeman of the Gulf, Colorado, & Santa at Brownwood, Tex., has been promoted to the position of assistant machine shop foreman, with headquarters at Cleburne, Tex.

W. R. WARDLAW has been appointed general foreman of the Illinois Central, with headquarters at Carbondale, Ill.

J. U. HOUSER, boiler gang foreman of the Illinois Central at Paducah, Ky., has been promoted to the position of general boiler foreman.

C. V. CONLISK, general foreman of the Gulf, Colorado & Santa Fe at Sweetwater, Texas, has been transferred as general foreman to Brownwood, Tex.

C. W. MURPHY of the Illinois Central at Jackson, Tenn., has been transferred to Paducah, Ky., as boiler gang foreman, succeeding J. U. Houser.

JAMES E. MANN, erecting shop foreman of the Boston & Maine at Billerica, Mass., has been appointed machine shop foreman.

ARTHUR A. HUGHES has been promoted to the position of erecting shop foreman of the Boston & Maine, with headquarters at Billerica, Mass.

J. T. MCBRIDE has been appointed enginehouse foreman of the Baltimore & Ohio, with headquarters at Massillon, Ohio.

J. R. CLARK, general foreman of the Atchison, Topeka & Santa Fe at Amarillo, Tex., has been appointed general foreman, with headquarters at Clovis, N.M.

JOSEPH E. KELLER, machine shop foreman of the Boston & Maine at Billerica, Mass., has been appointed shop superintendent, with headquarters at Somerville, Mass.

M. M. JOHNSON, assistant machine foreman of the Gulf, Colorado & Sante Fe., has been promoted to the position of toolroom foreman, succeeding C. H. Lewis, deceased.

L. F. WRIGHT, first assistant enginehouse foreman of the Pennsylvania at Enola, Pa., has been promoted to the position of enginehouse foreman, with headquarters at East Altoona, Pa.

H. C. VINSANT, night enginehouse foreman of the Texas & Pacific at Mineola, Tex., has been promoted to the position of day enginehouse foreman, with headquarters at Big Spring, Tex.

D. P. BLOSER has been appointed assistant enginehouse foreman of the Pennslyvania, with headquarters at Enola, Pa. Mr. Bloser was formerly assistant enginehouse foreman at Harrisburg, Pa.

C. R. MCMILLAN, boiler maker of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been promoted to the position of general boiler foreman, with headquarters at Clovis, N. M.

D. G. MCMUNN has been appointed enginehouse foreman of the Pennsylvania, with headquarters at Cape Charles, Va. Mr. McMunn was formerly enginehouse foreman at Orangeville, Md.

W. E. MULLEN has been appointed enginehouse foreman of the Pennsylvania, with headquarters at Northumberland, Pa. Mr. Mullen was formerly enginehouse foreman at East Altoona, Pa.

C. R. MYER, has been appointed enginehouse foreman of the Pennsylvania, with headquarters at Orangeville, Md. Mr. Myer was formerly enginehouse foreman at Northumberland, Pa.

Purchases and Stores

THE HEADQUARTERS of W. F. Wright, purchasing agent of the Louisiana & Arkansas Lines, have been moved from Shreveport, La., to Minden.

T. E. SAVAGE, assistant to manager of purchases of the Erie, has been appointed assistant purchasing agent, with headquarters at New York.

THE TITLE OF H. T. Shanks, purchasing agent of the Louisville & Nashville, at Louisville, Ky., has been changed to general purchasing agent.

Obituary

W. L. ROBINSON, superintendent of fuel and locomotive performance of the Baltimore & Ohio, with headquarters at Baltimore, Md., and a former president of the International Railway Fuel Association died suddenly at his home in Jessup, Md., on August 7, following a brief illness. Mr. Robinson was born in Danville, Va., on October 6, 1883, and his entire railroad career, of some 26 years, was wholly with the Baltimore & Ohio. He entered the service of that company as a special apprentice in the Mt. Clare shops, Baltimore, in 1904, after graduating from Purdue University. Following a three-year apprenticeship, he became a special inspector in the mechanical department, later being promoted to enginehouse foreman at Garrett, Ind.

W. L. Robinson

In 1911 he was advanced to superintendent of shops at Martinsburg, W. Va., returning to Baltimore in the same year as special inspector at the Mt. Clare shops. In April, 1912, he was promoted to road foreman of engines of the Baltimore division of the Baltimore & Ohio, and in October of the same year he was advanced to the position of supervisor of fuel consumption. After serving in this capacity until March, 1918, Mr. Robinson resigned from the service of the Baltimore & Ohio to accept a position with the operating department of E. I. du Pont de Nemours & Co., at Wilmington, Del., returning to railroad service in October of the same year as supervisor of fuel consumption on the Baltimore & Ohio Western lines, the Dayton & Union and the Dayton Union (both then operated by the Baltimore & Ohio), with headquarters at Cincinnati, Ohio. When this position was abolished two months later, Mr. Robinson was appointed superintendent of fuel and locomotive performance of the same roads, serving in this position until June, 1919, when he became division master mechanic of the Illinois division of the Baltimore & Ohio at Washington, Ind. In January, 1921, he was appointed superintendent of fuel and locomotive performance of the Baltimore & Ohio, with headquarters at Baltimore, Md.

In addition to his regular duties with the Baltimore & Ohio, Mr. Robinson had been active in the work of a number of railway associations, particularly with the International Railway Fuel Association. As mentioned above, he served as president of that association during 1921 and 1922 and was a vice-president of the same organization from 1916 to 1918 and again from 1919 to 1921. He was also a member of the executive committee from 1914 to 1916 and from 1922 to 1925, and chairman of the advisory committee from 1926 to 1929. He was the author of various reports presented at conventions and a member of various topical committees. From 1914 to 1917 he also served as vice-president of the Traveling Engineers' Association and from 1925 to the present was a member of the executive committee of that organization. In 1918 he was a vice-president of the Smoke Prevention Association. Mr. Robinson was also active in safety work on the Baltimore & Ohio, serving on the general committee representing the mechanical department of that road at the time its safety campaign was first organized.

Henry Holze, assistant foreman of the car department of the New York Central at Kensington, Ill., died at his home in Chicago on July 2.

Ernest S. Newton, purchasing agent and storekeeper of the Gulf, Colorado & Sante Fe, with headquarters at Cleburne, Tex., died on July 23. Mr. Newton had been in the service of that road for nearly 41 years.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers. State the name and number of the bulletin or catalog desired, when mentioned in the description.

Crank Shaper.—The American Klopp crank shaper is described in detail in the 16-page booklet being distributed by the American Klopp Shaper Corporation, 50 Church street, New York. The shaper is of the crank type, the tool being carried on a reciprocating ram.

Arc Welding.—Automatic Arc Welding Data Bulletin No. 14 has been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. A number of automatic arc welding applications are described in this bulletin and the actual cost of hand and automatic welding compared.

Interchangeable Punches and Retainers.—Hercules interchangeable punches and retainers, which are designed to eliminate the necessity of removing the die from the press to change punches when piercing metal, are described in a 24-page illustrated booklet issued by Whitman & Barnes, Inc., Detroit, Mich.

Standard Machine Tool Gray.—The National Machine Tool Builders' Association, 1415 Enquirer building, Cincinnati, Ohio, outlines in bulletin No. 811 the reasons for establishing a standard color for machine tools which will eliminate the annoyances, waste and difficulties that previously existed on account of multiplicity of colors.

Armco Ingot Iron.—The American Rolling Mill Company, Middletown, Ohio, has issued two new folders entitled "Fighting Corrosion in Refrigerator Cars with Durable Armco Ingot Iron" and "Locomotive Jacket Sheets that Form Easily and Endure." The former folder points out four major losses in refrigerator car sheet metal equipment that arise from corrosion and premature failure, and the latter points out the advantages of Armco ingot iron over ordinary materials.

Car Impact Plant.—The Waugh-Gould car impact plant, designed and built with the idea of duplicating, so far as possible, actual service conditions for draft gear tests, provides the subject for discussion in an attractive booklet issued by the Waugh Equipment Company, Depew, N. Y. The method of conducting a test with two 70-ton all-steel hopper cars, some of the instruments used, and the action of cars during impact are described and illustrated, and the procedure for car impact tests of friction gears outlined. The facilities at this plant are available to railroad officers who are interested in determining, under their own supervision and test methods, the exact characteristics of Waugh-Gould draft gears.

Forgings.—The four-page bulletin issued by the Camden Forge Company, Camden, N. J., briefly outlines the progress of the Camden Company since its establishment in 1902. It also illustrates various locomotive forgings, such as axles, piston rods, pins and equalizers, and part of the Camden nitriding equipment.

Linatex.—Linatex, a rubber for mining, engineering and industrial uses, is described in a 24-page booklet issued by the Wilkinson Process Rubber Sales Corporation, 53 West Jackson Boulevard, Chicago. On railroads Linatex is used for buffer pads, draw gear pads, body cushions and window cushions and as anti-squeak material in all places where vibration or sound requires absorption

Locomotive Cranes. — An attractive booklet of 15 pages, designated No. 309, has been issued by the Industrial Brownhoist Corporation, Cleveland, Ohio, which illustrates and describes in detail the complete line of gasoline- and Diesel-powered locomotive cranes manufactured by that company. This line of cranes includes machines with capacities ranging from 10 tons to 40 tons.

Machinists' Tools.—The Lufkin Rule Company, Saginaw, Mich., has issued a new catalog confined to the products of its small tool division; i. e., machinists' fine tools. This is known as catalog No. 6 and includes micrometers, calipers, dividers, combination squares, steel scales, depth gages, thickness gages, radius gages, screw pitch gages, steel reference tables, hook rules, bevels, center punches, etc.

"Togglebug" Drill.—The Togglebug, a portable drill which takes up little space and can easily be stored, is described in an illustrated 16-page catalogue issued by the Guibert Steel Company, Pittsburgh, Pa. The drill can be moved about by man power, by crane or hoist, by truck, or by other means and is adapted for drilling through steel, wood, cast iron, cast steel and similar material.

Whiting Equipment.—An attractive, illustrated catalog of seven sections has been issued by the Whiting Corporation Harvey, Ill. Section I describes the construction and operation of, accessories for, and special types of Whiting electric drop pit tables, and blue print sketches show plans for small terminal layouts. Section II illustrates and describes the Whiting electric locomotive hoist designed for wheeling and unwheeling locomotives of various types and weights at any point on a system. A typical division point layout is shown in cross section. Section III describes the electric locomotive spotter for moving light and heavy locomotives requiring a change of position for certain repairs; Section IV, coach hoists; Section V, combined car washer and scrubber; Section VI, miscellaneous equipment, such as transfer tables, crossover bridges, turntables, movable platforms, etc., and Section VII, cranes for railroad shop and yard service.